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COMPUTERWORLD

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Spotlight — VDTs are shaping up to face the competition from micros. This generation boasts more features muscle and trimmer prices. **Follows page 40.**

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Processor parade. A big wave of hardware announcements hits the market, including the following:

- National Advanced Systems XL 70, positioned to take advantage of a perceived gap in IBM's lineup. **Page 5.**
- DEC's expected assault on the data center market with powerful clusters of VAX 8700s. **Page 10.**
- Encore Computer's parallel processing system, said to offer up to 40 MIPS. **Page 4.**
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ANSI's SQL standard differs from IBM's version. **Page 8.**

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The once invincible Wordstar gets its first major revamp in three years. **Page 12.**

Users of 8100 led down path

IBM will port DPPX to 9370

By Jean S. Bozman

IBM will port the DPPX operating system for its 8100 distributed processing systems to run in native mode on the IBM 9370, the company confirmed last week. But 8100 users seeking a speedy migration path will have to wait at least two years.

Although no public announcement has been made, a company spokesman confirmed that an evaluation of DPPX/SP executing on the IBM 9370 was successfully concluded. "We are proceeding with development, which is expected to take at least two years," the spokesman said.

That two-year development effort may not be enough to retain the loyalty of 8100 users, many of whom, according to a recent survey, are evaluating or planning migration to other alternatives (see story page 91).

IBM said it decided to retain DPPX/SP as a "full-function product for centrally managed distributed networks." The spokesman added, "We believe that DPPX/SP is a state-of-the-art software product that provides high levels of function and capability."

Central-site management

DPPX allows central sites to monitor remote 8100 sites and, if necessary, to shut them down. For this reason, some industry analysts believe that DPPX will strengthen the role of central-site management in a distributed network of IBM 9370s.

In a speech to the Guide User Group last spring, an IBM executive said the company planned no further 8100 hardware offerings but was evaluating moving the DPPX environment onto 370-based systems.

While the 8100's days appear numbered, the IBM 8150 is still in production, the IBM spokesman said last week. Users can buy 8100 hardware, software and applications from IBM until an unspecified time when an alternative is available, the company said. In addition, users may buy older 8100 models, including 8130s and 8140s, from third-party resellers or lessors, industry analysts said.

The fate of the DPCX operating system appears tied to the remaining lifespan of the 8100. In its presentation to Guide last spring, IBM said DPCX would not be functionally enhanced in the future. Unfortunately for DPCX users, said William Ackerman, vice-president of Distributed Systems, Inc. in Cupertino, Calif., it will be far easier for

See **USERS** page 91

Wang on offensive, revamps VS

By James Connolly

LOWELL, Mass. — Only six days after announcing job reductions and an expected quarterly loss of more than $30 million, Wang Laboratories, Inc. went on the offensive last week by restructuring the upper half of its minicomputer line.

Wang officials, repeatedly stating their commitment to the commercial data processing market and to compatibility throughout Wang's product line, introduced the VS 7000 series as a successor to the VS 85, VS 100 and VS 300. In addition, the company enhanced its Professional Application Creation Environment (see story page 6) and announced plans to offer later this year a dual-proces-

See **WANG** page 6

1-2-3 sue! Lotus vs. clones

By Douglas Barney

CAMBRIDGE, Mass. — Landmark lawsuits filed by Lotus Development Corp. against two firms that allegedly cloned its software may forever change the nature of software development as well as the characteristics of software available to users.

Many users and much of the software industry are up in arms over the suits filed last week, which allege that Paperback Software International, Inc. and Mosaic Software, Inc. violated Lotus's copyright by cloning 1-2-3. Others applaud Lotus's effort to protect a market the firm worked hard to create.

Filed in U.S. District Court in Boston, the suits allege false advertising and unfair trade practices. Lotus seeks to prevent the sale of the clone products, Paperback

See **1-2-3** page 8

IBM finds friends in bid to influence OSI standard

By Elisabeth Horwitt

PARIS — IBM, allied with two leading European vendors, is expected this week to again attempt to embed elements of its LU6.2 protocol in the Open Systems Interconnect standards.

While use of LU6.2 as the basis for OSI transaction processing protocols could shorten the road to fully functional OSI products, users, vendors and industry analysts fear the possibility that IBM would use LU6.2 as a Trojan horse to gain further dominance in the marketplace.

At the International Standards Organization Transaction Processing Subcommittee meeting, to be held here this week, a contingent comprising IBM, Siemens AG and

See **IBM** page 10

SUPERBOWL PRINTOUT

Fortran forecaster says Orange Crush will fizzle

Pat Summerall: "Well John, the Giants are grinding it out on the ground, throwing short passes and sticking to their game plan, but the Broncos are throwing more and more, trying to catch up."

John Madden: "Yup, it's just like Bud Goode said: Football is still a running game. He picked the Giants by four, and it looks like he's going to hit it right on the head. Goode definitely makes the All-Madden Team."

By Bruce Hoard

LOS ANGELES — The New York Giants. The Denver Broncos. Pat Summerall. John Madden. Bud Goode. The biggest names in the biggest football game of them all, the Super Bowl.

Goode, you say? Who in the world of pigskin is Bud Goode? Ask Giants coach Bill Parcells; he's a client of Goode. Ditto Chicago Bears' mentor Mike Ditka and four more of the National Football League's most illustrious head coaches.

To these NFL head coaches, Goode is a statistical analyst par excellence. To readers of the *Philadelphia Inquirer*, he's a fearless Fortran forecaster, picking NFL games against the Las Vegas line. To others, he's

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Denver quarterback Elway

NEWSPAPER

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Fannie Mae system wins out

Fixed 1,500 software bugs before start-up

By Mitch Betts

WASHINGTON, D.C. — Despite 1,500 software bugs that had to be fixed and a cost overrun of $25 million, the Federal National Mortgage Association, commonly called Fannie Mae, successfully cut over to its new Laser Reporting data base system in October and has achieved three months of smooth operations, according to a major user of the system.

Skeptics had doubted the $50 million system would work because of the numerous software bugs in the complex Cobol software and the lack of a backup system [CW, Aug. 11]. The skeptics included disgruntled programmers at Fannie Mae as well as outside mortgage lenders who transmit data to the system.

"A lot of them are amazed that we got it installed, but they acknowledge that we got it in, it works and it's doing a creditable job," said Richard Leegant, senior vice-president for mortgage administration at Fannie Mae and the major in-house user of the system. Laser Reporting provides monthly updates on two million loans, based on monthly accounting reports filed by 600 lenders.

Leegant reported that the error rate for Laser Reporting was 2% in its first month and was subsequently reduced to 1.5%. He attributed the successful installation to a pilot test that essentially put the system through a dress rehearsal and numerous 12-hour days spent by teams of users and programmers aiming to meet the Oct. 1 deadline for start-up.

Leegant said the pilot test ran for four months with 10% of the loan data while the old exception system was still running. "So when we went live with Laser, there were no surprises, because we had run the equivalent of a parallel system for several months with a substantial volume of loans," he said.

Furthermore, he said, virtually all of the 1,500 software bugs were minor. Most of the bugs took only four to eight hours to fix, Leegant added, noting that a recent audit showed that 99% of the Cobol was structured code.

MAP/TOP users group signs COS for financial assist in development

By Rosemary Hamilton

PHOENIX — The complex and expensive task of establishing networking standards for the factory floor and office environment has prompted a users group to seek both technical and financial assistance from the Corporation for Open Systems (COS), an independent group made up primarily of vendors.

The Manufacturing Automation Protocol/Technical Office Protocol (MAP/TOP) Users Group officially agreed last week to sponsor a June 1988 demonstration of MAP/TOP Release 3.0, the next release of the factory and office networking specifications, which originally had been scheduled to debut this November.

According to Charles Gardner, chairman of the MAP/TOP Users Group Steering Committee, COS will take development and financial responsibility for approximately 40% of the testing effort, which Gardner estimated will have a total cost of between $15 million and $20 million.

COS, established a year ago, is an international group of vendors and users whose goal is to accelerate the establishment of computer and networking standards.

A COS spokeswoman said the organization did not know what the total cost of MAP/TOP test development would be but estimated that COS's portion would represent a $3 million to $4 million investment. She also said the 40% portion assigned to COS by the users group is still being worked out.

"It may have been possible to do it on our own, but it would have been hard for the users to rationalize all these costs themselves," Gardner said.

Despite this alliance, the MAP/TOP organization found itself unable to ready all the necessary tests by the original target date in November for the debut of MAP/TOP Release 3.0.

According to Tony Durham, a users group member who serves as MAP liaison to the General Motors Corp. advanced engineering staff, the delay has nothing to do with the development of the MAP/TOP Release 3.0 specifications, which he said will be ready by year's end.

MAP and TOP are sets of emerging standards that are based on the International Standards Organization's Open Systems Interconnect seven-layer networking model. MAP, whose major backer is GM, was designed for the factory floor; TOP, whose primary promoter is Boeing Computer Services Co., was to be MAP's counterpart in the office environment.

MAP/TOP Release 3.0 was originally scheduled for public introduction at the Autofact '87 trade show, which will take place in November. Unlike the MAP demonstration at the Autofact '85 show, which Gardner called a prototype version of future products, the users group wanted the Release 3.0 demonstration to show product-level components.

To achieve this, the user organization decided that a whole series of tests would be needed. All suppliers, including hardware and networking vendors, will be required to pass the conformance tests to ensure that their products adhere to the MAP/TOP Release 3.0 specifications.

When the users group announced the Autofact '87 debut of Release 3.0 last September, it was negotiating with COS to join in what was then dubbed the 1987 MAP/TOP Enterprise Networking Event. As negotiations proceeded, "we realized that the testing program time line did not follow the original projection," GM's Durham said.

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SPOTLIGHT

In the terminal market, fierce competition has driven prices down and has spurred the development of new functional features. Meanwhile, integrated voice/data terminal makers are coaxing executives toward the keyboard with a host of telephone-convenience and time-management features. By JoAnn Granger/ **Follows page 40**

IN DEPTH

A good gamble: By marketing its homegrown software for outside use, a company can parlay an investment of time and money into a profitable venture. By Richard Raysman/ **41**

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Encore upgrades Multimax parallel processor

Designed as general, not specialized, system

By James Connolly

MARLBORO, Mass. — Acknowledging it is depending on software developers to produce commercial data processing Unix software that can be optimized for parallel processors, Encore Computer Corp. last week introduced a parallel system designed to provide more than twice the performance of the firm's first processor.

Encore President James R. Pompa said the Multimax 320, unlike many other parallel processors, is designed as a general-purpose computer rather than as a specialized scientific system. "We believe general-purpose parallel processing is an emerging trend," Pompa said. He cited data base management as one of the key markets for parallel systems.

The basic difference between the Multimax 320 and the year-old Multimax 120 is the use of a National Semiconductor Corp. 32332 processor in the newer system rather than the 32032 in the Multimax 120. The Multimax 320 uses Encore's 100M byte/sec. Nanobus system bus and UMAX operating system, which were introduced with the Multimax 120.

However, the Multimax 320 will run a version of UMAX designed to be compatible with AT&T Unix System V.3 or the University of California at Berkeley Unix Version 4.2.

Encore claimed the 32332 processes up to 2 million instructions per second (MIPS). The Multimax 320 houses up to 10 processor cards, each with two microprocessors, for a maximum performance of 40 MIPS, compared with 15 MIPS for the Multimax 120, Pompa said.

The processors can share 128M bytes of main memory and 100G bytes of storage. Encore also announced a mass storage card said to increase I/O to 60M byte/sec.

Scheduled to be available in April, an entry-level, 4-MIPS Multimax 320 costs $131,000. Additional processor cards cost $29,000 each.

Pompa reported that Encore has installed 40 Multimax 120s, with about 30 of those being delivered to research centers and the remainder being used in commercial fields, including the commercial scientific area.

"If all of those 40 machines are revenue-producing machines for Encore, that's an interesting development. That means they have been much more aggressive than I expected," noted Itom International President Omri Serlin, a Los Altos, Calif.-based observer of the parallel processing industry.

Serlin said several parallel processor makers have been trying to drive into the commercial DP market, particularly in the data base area, but that packages such as data bases will require heavy modification by Encore before they are suited for parallel processing.

Serlin and Thomas Willmott, vice-president of International Data Corp., a Framingham, Mass.-based market research firm, said Encore has made progress in reducing expenses. Willmott said Encore was hurt by the resignation of cofounder Gordon Bell last year but that Bell was instrumental in developing the Nanobus, which the company can build upon for several years.

Willmott said a downside of the Multimax 320 is the machine's continued use of National Semiconductor chips when many Unix systems are running Motorola, Inc. microprocessors.

Forecaster predicts fizzle

From page 1

just Groucho Marx's former PR man.

Whether he's servicing coaches or fans, Goode relies on the same 80-page computer printout, a compilation of 170 sometimes arcane football variables. Each week, he trundles down to the nearby Unisys Corp. computer center, runs his weekly stats through a Univac 1106 and then shares the results with the coaching cognoscenti and would-be bettors who read the *Inquirer*.

"I'm satisfied that I can explain the game," Goode says. "But picking against the line is a 50-50 proposition."

In this, his eighth year of performing computerized prognostication, he claims to have finished a couple of games more than 50-50. But, as he is quick to note, "I do not incite to bet."

Nor does Goode necessarily respect other, less scientific forecasters who do incite to bet.

Of Jimmy the Greek, he says without pause, "The Greek is an interesting person, but you could write the world's thinnest book on what he knows about football. That's a quote." Indeed.

What Goode does incite is a sea of stats, many of which spring from differential variables. For example, consider his most significant stat of all, the difference in the number of running plays.

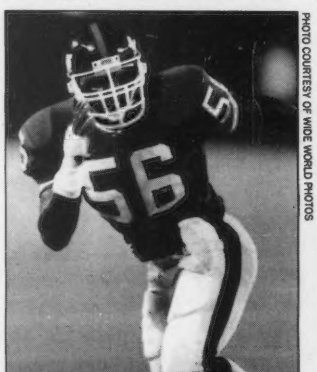
He bases his Giants-by-four pick in this Sunday's Super Bowl XXI on this key category.

The Giants lead the league in executing more running (or *rushing* in football parlance) plays than their competition. This year they averaged 13 more rushing plays per game than the opposition.

Denver, on the other hand, is not a strong rushing team, averaging a relatively paltry 1.4 rushing-play advantage against the competition.

"I'd be surprised to find Denver with five first downs on the ground against the Giants," Goode notes. "They have to throw to win."

But be careful there, Bronco quarterback John Elway, because if you throw more than two interceptions, you have committed what Goode calls "a fatal error in computerese," meaning your chances of winning are extremely remote.



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The Giants' Lawrence Taylor

Now, mix up all these numbers, shake well, and you arrive at the inexorable Goodean conclusion: The Giants shall triumph on the ground while the Broncos fill the air with footballs.

True to form, Goode won't bet on the game. But he does gamble in the stock market. "The last few days have given me a new car," he proudly relates. "I'm going to buy my wife a T-Bird."

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NAS improves AS/XL channel rate with dyadic processor

By Jeffry Beeler

MOUNTAIN VIEW, Calif. — National Advanced Systems Corp. (NAS) last week plugged a hole in its largest mainframe family by introducing a dyadic processor that reportedly provides a performance compromise between IBM's 3090 Models 200 and 400.

In adding the Model 70 to its AS/XL series of IBM-compatible machines, the company also doubled the product line's channel transfer rates from 3M to 6M byte/sec. The enhancement, which will be extended to all six AS/XL members, makes NAS's channel throughput twice as high as the 3090's and 33% faster than Amdahl Corp.'s mainframes'.

To accommodate the accelerated data transfers, NAS has enhanced its existing Model 7900 semiconductor disk subsystem with the addition of a second controller option, the 7970-3. The introduction enables the semiconductor disk's 7990-2X storage modules, which previously moved a maximum of 3M byte/sec., to support the AS/XL family's improved channel rates.

Rounding out its suite of announcements, NAS disclosed its intention to make expanded memory available as an option on all its AS/XL-series models, including the just-announced AS/XL 70. Support for expanded memory will begin during the third quarter.

Reaction favorable

Among industry analysts, reaction to last week's NAS moves was generally favorable. New York investment banking firm Kidder Peabody & Co. Vice-President Adam Cuhney said he expects the announcements to appeal strongly to the company's target customers.

"During fiscal 1987, NAS has been nothing short of phenomenal in its ability to attract new accounts," Cuhney said; the latest additions to the AS/XL line will almost certainly give the firm's recent successes further momentum, he added.

IBM and plug-compatible manufacturer analyst Bob Djurdjevic, head of Annex Research, Inc. in Phoenix, said he views the product less as an effort to attract new customers than as a response to recent criticisms. Last year, he said, NAS suffered from disclosures that its AS/XL 60 uniprocessor provides less computing horsepower than its closest IBM rival, the 3090 Model 200.

But NAS did gain an edge with the introduction of 6M byte/sec. channels, Djurdjevic added.

That will do users little good, however, until NAS can offer storage devices that match the channel speed. "Most peripherals out there on the market today still operate at 3M byte/sec.," noted Don Foster, who specializes in hardware acquisitions for Pacific Gas & Electric Co., a large NAS user. During the system announcements, however, NAS officials referred to upcoming storage product announcements but provided no details.

Since March 1985, when the AS/XL line made its debut, NAS has offered plug-compatible alternatives to IBM's two original Sierra series members. The AS/XL 60, a uniprocessor, corresponds to the 3090 Model 200, and the dyadic AS/XL 80 competes with the 3090 Model 400.

During the ensuing months, however, NAS claims to have noted a sharp upturn in the number of users who want more power than a 3090 Model 200 can deliver but who are unwilling to jump to a Model 400. So to provide such users with a happy medium, the vendor decided to create a deliberately degraded version of the AS/XL 80, according to Carl Claunch, director of NAS systems marketing.

The result is the AS/XL 70, which outperforms the AS/XL 60 by 20% to 40% but offers only 60% to 80% as much internal throughput as the AS/XL 80, Claunch said.

Although both of NAS's Sierra-class dyadic mainframes boast identical channel and main memory capacities, the AS/XL 70 holds just half as much cache and dynamic working storage — 128K bytes and 512K bytes, respectively — as the AS/XL 80.

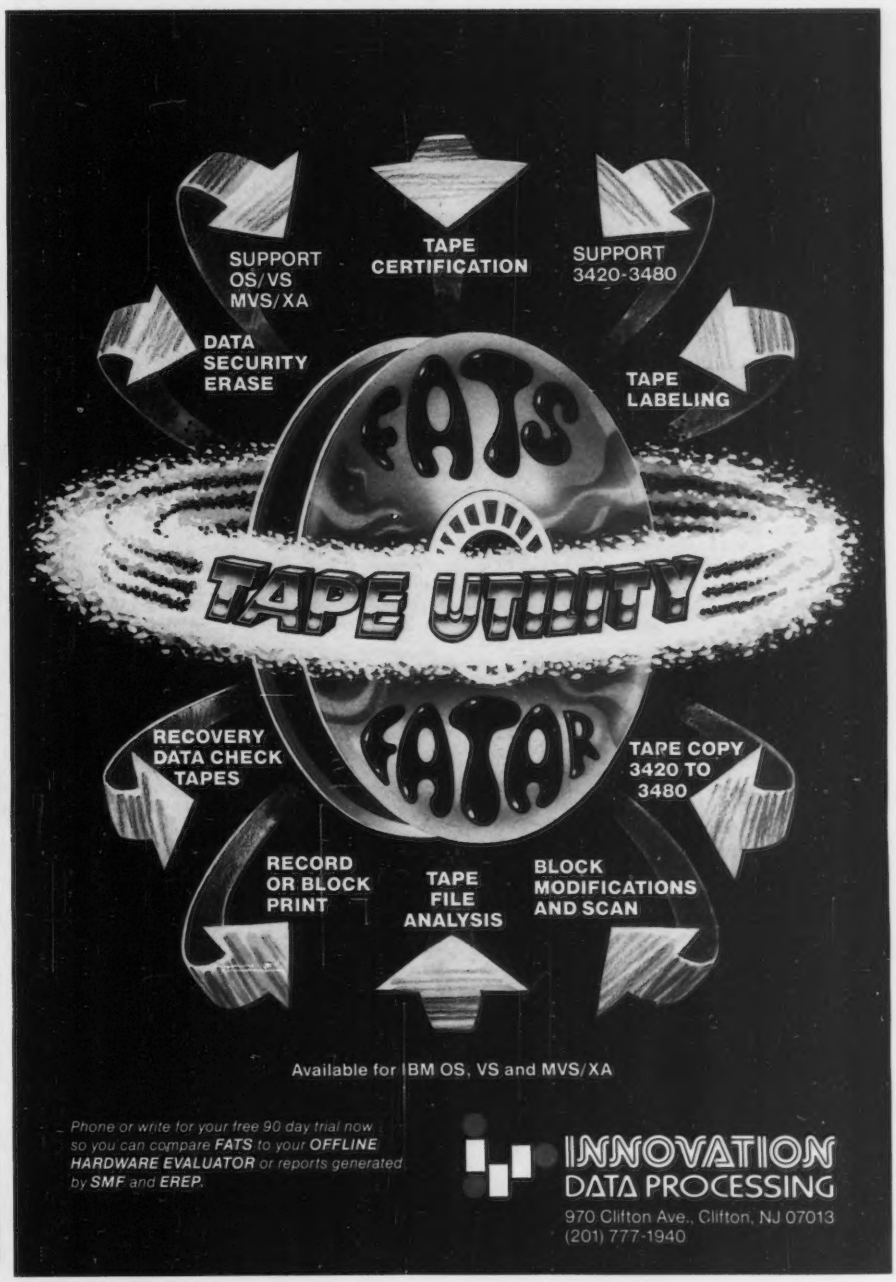
Configuration options

For any given top-of-the-line NAS mainframe, users will have the option of configuring up to half their available channels for 6M byte/sec. operation.

The twofold improvement in the AS/XL's data rates necessitated the introduction of the 7970-3 controller, which moves up to 6M byte/sec. In extending the increased channel speed to the 7900 semiconductor disk subsystem, NAS expects to halve the mainframe line's I/O response times and double its I/O transaction rates, according to Minh Le, director of the firm's peripherals marketing.

The AS/XL 70, which holds up to 256M bytes of main memory, costs $5.28 million in a minimum configuration of 32 channels and 64M bytes. Customer shipments of the machine will start by the end of the current quarter.

Support for the semiconductor disk subsystem's 6M byte/sec. channel transfers, by contrast, will begin in April. The 7970-3 controller that makes the increased speed possible sells for $87,750.



Wang moves to beef up its application development system

Package easier to use, extends current features

By Rosemary Hamilton

LOWELL, Mass. — Wang Laboratories, Inc. last week rolled out a new release of its Professional Application Creation Environment (PACE) software that increases the package's basic functionality, such as its ability to integrate PACE data with software applications from Wang and other vendors.

PACE 2.0, a set of software application development tools built around a relational data base management system, is available now with license fees starting at $13,000.

Current PACE users under service contracts can upgrade without charge; users without contracts can upgrade for fees starting at $850.

The announcement did not include many new features but concerned extensions of existing features. For instance, the latest release allows users to integrate PACE data into a VS Wang 20/20 spreadsheet — Wang's version of Access Technology, Inc.'s 20/20 tool — with fewer commands than the previous version of PACE.

Chuck Raudonis, director of research and development at Philadelphia-based Fidelity Mutual Life Insurance Co., which was a beta-test site for PACE 2.0, said the new release is easier to use. "Now I can just hop out of PACE and into the host language interface environment."

Raudonis, who develops data base applications with PACE on a Wang VS 300, gave the software high marks. "It enables us to get a data base out in about half the time it would take coding it in Cobol," he claimed.

PACE 2.0 expands integration beyond Wang Word Processing to WP Plus and increases the Wang Office electronic mail functions for the PACE environment, according to Judy Cole, a PACE product manager.

The application development component of PACE has many added programming functions, such as more flexible relationship definitions to define fields.

The data dictionary has an expanded number of rules that can be applied to govern the processing of data and ensure data consistency.

The decision support component of the system now includes such features as the ability to merge a spreadsheet with a query or data file at runtime.

Wang takes offensive

From page 1

sor high-end system, a virtual machine operating system environment and a resource-sharing facility similar to Digital Equipment Corp.'s clustering capability.

The VS 7000 systems include a top-of-the-line VS 7310-300 product comparable to the earlier high-end VS 300 but with room for conversion to a dual-processor 7320 when that product is shipped later this year. The other three VS 7000 systems — the VS 7110, VS 7120 and VS 7150 — reportedly provide gains of up to three times the performance of the VS 85 and VS 100. The older systems will continue to be marketed, according to Wang officials.

During the announcement, Wang President Frederick A. Wang said the firm will expand its sales force, particularly with personnel experienced in vertical markets, and will improve its consulting services. Wang reported that orders for the VS 300 rose in late 1986, but he said that the balance of orders has been tilted too far toward lower end systems such as the VS 5, VS 6 and VS 65.

"What we really have to do is leverage the momentum we have going. I don't mean the lost momentum but the order-rate momentum," Wang said. He charged there is still a misconception on the part of some observers that Wang is a word processing company and said the VS series was designed as a distributed DP system 14 years ago and continues to serve in that role.

The new VS models use the same hardware architecture, based on Wang's CP8 67.7M byte/sec. system bus, and operating system — Wang VS Release 7 — as the VS 300.

Noting that Wang recently eliminated bugs in VS Release 7 in order to let the VS 300 run properly, analyst John McCarthy of Cambridge, Mass.-based Forrester Research, Inc. said, "The announcement is important for Wang because it puts the problems of the VS 300 behind them and lets them show that the architecture does work."

McCarthy and other analysts said the key to Wang's announcement was its message rather than the technical capabilities of the systems. To him, McCarthy said, the message was that Wang wants to differentiate clearly the VS product line from competing DEC and IBM lines. He said the VS 7000 systems appear to be more reliable and easier to produce and upgrade than the earlier systems.

"The most interesting thing from my point of view was the positioning of the products and the way Wang is putting on a new and fresh face and telling the world how they want to be perceived as a DP company. In terms of the VS line, it is rejuvenated but not seriously changed," said Richard Mikita, director of processor programs at International Data Corp., a market research firm in Framingham, Mass.

Van Weathers, director of the business computer group for Dataquest, Inc., a San Jose, Calif.-based market research company, said the significant performance gains in the VS 7000 should help the company boost its lagging high-end sales.

One market research firm that was less positive about the announcement was the Yankee Group in Boston.

"Some of the things they didn't talk about or elaborate on are most important," said industry analyst Irene Costello, noting the most important products are the VS 7320, the resource sharing facility and the VS virtual machine environment. She said one subject Wang should have addressed was a continuing public perception that Wang's service and support are poor.

One Wang customer reported he was pleased with the announcement, even though the new products will have minimal impact on his company. "Now I want to see what comes next," said Neal O'Brien, director of systems and programming at Mony Financial Services in Syracuse, N.Y. O'Brien, whose company uses numerous smaller VS systems, said he hopes the high-end activity signals moves throughout the rest of the Wang product line, particularly with greater minicomputer and personal computer integration.

Unfamiliar with details

Most MIS managers questioned about the announcement said they were unfamiliar with the details. However, Philip D. Dowlin, director of information services for Midcon Services Corp., was present for the introduction and reported his company has received a VS 7150. He said the installation went smoothly.

The three VS 7100 systems are housed in a 36- by 36- by 25-in. cabinet designed for an office environment. Each system features a minimum memory of 4M bytes, with expansion capability to 16M bytes, and supports up to 128 users.

Wang Vice-President Harold P. Ano said the active users supported without performance degradation, depending on the application mix, are 35 to 70 for the VS 7110, 50 to 100 for the VS 7120 and 60 to 120 for the VS 7150.

Ano claimed the VS 7110 provides 1½ to 1¾ times the performance of the VS 85, while the VS 7150 provides up to three times the power of the VS 100. They cost from $90,000 for the entry-level VS 7110 to $232,000 for a fully configured VS 7150.

The VS 7310-300 provides the performance of a VS 300 but is housed in a 36- by 48- by 25-in. cabinet with space for a second processor.

Wang Laboratories, Inc.
VS product line

	VS 5	VS 6	VS 65	VS 7110	VS 7120	VS 7150	VS 7310/300
Maximum Users	8	16	40	128	128	128	192
Memory Range (bytes)	1M-2M	1M-4M	1M-4M	4M-16M	4M-16M	4M-16M	8M-16M
Cache (bytes)	None	16K	16K	32K	32K	32K	32K
Disk Capacity (bytes)	2.6G	2.6G	2.6G	9G	14G	14G	24G
Cycle Time (nsec.)	480	200	200	240	180	120	120
I/O Bandwidth (byte/sec.)	2.5M	5M	5M	33.3M	33.3M	33.3M	33.3M
Mips*	.4	.7	.7	1.7	2.3	3.4	3.4
Price/ Memory	$12,000 (1M byte)	$19,950 (1M byte)	$19,950 (1M byte)	$90,000 (4M bytes)	$120,000 (4M bytes)	$160,000 (4M bytes)	$232,000 (8M bytes)

* Million of instructions per second, CW estimates.

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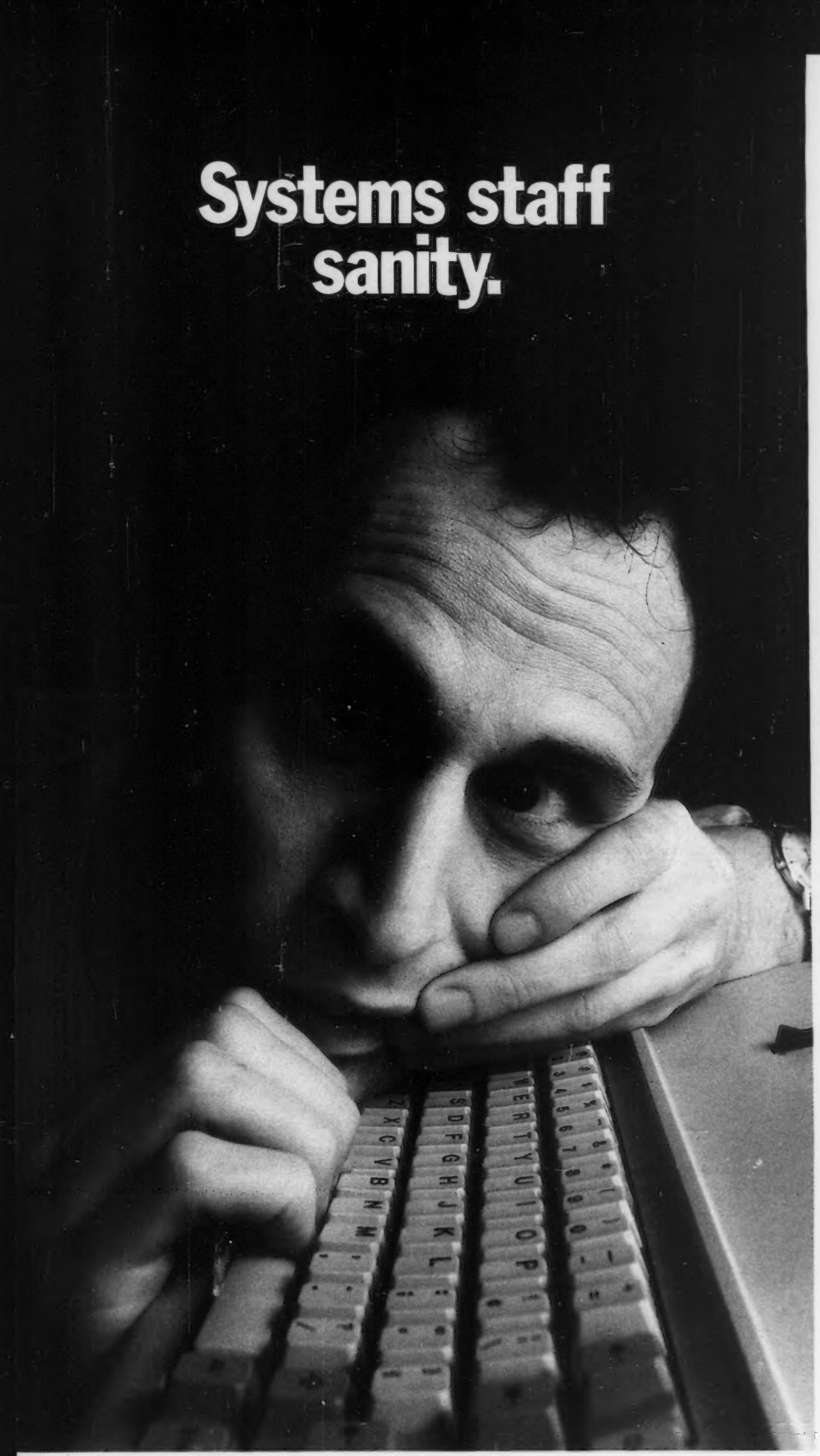

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ANSI's SQL standard differs from IBM's, other versions

By Charles Babcock

The standard for Structured Query Language (SQL) published by the American National Standards Institute (ANSI) differs slightly from IBM's and other marketplace versions of the relational data base access language, according to members of the panel that authored the standard.

SQL is used as the data access and manipulation language for IBM's DB2 and SQL/DS relational products as well as for relational products from Oracle Corp., Relational Technology, Inc., Informix Software, Inc. and Unify Corp.

Applications written in ANSI-standard SQL that take advantage of its extensions could not be run against DB2, said Phil Shaw, editor of the ANSI X.3H2 Committee document that was published as the standard. Shaw is a senior programmer with IBM's General Products Division in San Jose, Calif.

On the other hand, if the application were restricted to the SQL commands common to the ANSI standard and IBM's version, it would execute correctly with DB2, he added.

Standard debated, approved

The publication of the standard in December represented the final step in the approval process that began in October 1982. The X.3H2 panel is a technical committee of the ANSI X.3 Committee, which is responsible for standards supervision. Both committees debated and approved the standard and submitted it for public review before publication.

Publication of an SQL standard, however, will not halt developments in the language, according to X.3H2 Committee Vice-Chairman Carol D. Joyce, data base management system development manager at Relational Technology.

"We are going on with extensions to SQL and will continue to do so for the foreseeable future," Joyce said. These extensions include a scrollable cursor that could go backward to FETCH a previous row as well as forward for the next row, a constraint of the current forms of SQL, she said. When it is approved, the new version of SQL will be announced as SQL2.

Major differences

The major differences cited by Shaw and Joyce between the ANSI standard and IBM SQL are the following:

- IBM SQL requires the words integer and decimal to be spelled out in program statements; the ANSI standard allows them to be abbreviated as INT and DEC, Shaw said.
- In the definition of a character-string data type, IBM SQL requires that a length be specified; the ANSI standard makes the length definition optional.
- In IBM SQL, a column is constrained as unique in a clause in the CREATE INDEX statement; the ANSI standard allows the clause to be specified as unique in the CREATE TABLE statement.
- In IBM SQL, a UNION cannot be performed without first removing duplicates; in the ANSI standard, the UNION can be performed with duplicates by invoking an ALL option.
- Reserved key words differ between IBM and other vendors' implementations and the ANSI standard; users will need to define key words that go beyond those in the standard to take advantage of features in vendors' implementations.

Shaw said most of the differences between IBM SQL and the ANSI standard are no greater than the difference between IBM SQL and another vendor's version of the language.

Joyce said work on an International Standards Organization standard has proceeded in step with the ANSI committee's work and that at this point, the two standards remain identical. Feedback from European users was incorporated into the final version of the ANSI standard, she said.

1-2-3 sue! Lotus vs. clones

From page 1

Software's VP Planner and Mosaic's Twin, which have a look and feel very similar to that of 1-2-3. "While imitation is the sincerest form of flattery, in these two cases it happens to be the sincerest form of theft as well," claims Jim Manzi, Lotus chairman.

But, says Adam Osborne, president of Paperback Software, "1-2-3 was nothing but a copy and extension of Visicalc [the first electronic spreadsheet, produced by the former Software Arts, Inc.], while VP Planner is a massive improvement over 1-2-3." Officials of Mosaic were unavailable for comment.

Osborne says a countersuit will likely be filed. "Clearly, what they are doing is restraint of trade, trying to make sure that nobody can compete and drive down their prices," he charges.

Users undeterred

Despite the charges, users of VP Planner vow to continue with the product. "Lotus should be competing with R&D and not competing in the courts," says Joe Maly, planning officer for California First Bank in San Francisco, who says VP Planner is superior to 1-2-3 for his uses. For Lynne Hughes, a financial analyst with McDonnell Douglas Tymenet in San Jose, Calif., VP Planner is better than 1-2-3. "I don't think Lotus will win. Lotus doesn't have a lot of VP Planner's features," Hughes says.

Although the suits, which seek $10 million from each firm for punitive damages, threaten the survival of the defendants whose sales pale in comparison with Lotus's, the biggest impact may be on the entire software industry and user community.

If Lotus prevails in the suits, observers say, software developers may be forced to make applications different simply to stay out of court, at a major cost to increased end-user training. In fact, if the courts were to have fully protected the look and feel of software, 1-2-3 might never have been developed, some argue.

"Should the world not have had 1-2-3? Should Mitch have been afraid?" asks Dan Bricklin, president of the Software Garden, co-author of Visicalc and former Lotus employee.

According to Bricklin, Mitch Kapor, the former chairman of Lotus and co-author of 1-2-3, was beta-testing versions of Visicalc while developing 1-2-3. Bricklin sold Software Arts, the firm he headed, to Lotus, along with the rights to Visicalc, which is not now marketed by Lotus.

Perhaps most stunning is the potential negative impact on the computer industry, which has been lurching toward software standards. This possibility has touched off a virulent debate over the suits' impact on software innovation. Some fear that such lawsuits could spiral out of control and stifle innovation. Others wonder where and when it will end.

"What they are saying could be interpreted as meaning MS-DOS is an infringement upon CP/M and one Fortan compiler is an infringement on all other Fortran compilers," Bricklin says, referring to operating systems by Microsoft Corp. and Digital Research, Inc, respectively. "The implications are horrendous."

But others, such as Peter Marx, a partner in the Boston law firm Goulston & Storrs, side with Lotus. "Software is one of the last areas where America is dominant, and it is important to protect our innovators," Marx says. And Jeffrey Tarter, publisher of the Cambridge newsletter, "Softletter," agrees. "I want to see the clones squashed like bugs. People like Lotus and Ashton-Tate have done original work, and the clones are not doing original work," Tarter says.

Lotus argues that protecting so-called intellectual property rights encourages innovation. "In the long run, cheap imitations hurt our industry," Manzi says.

Javelin approach

But Javelin Software Corp. tried a different and innovative approach, and hoped its Javelin financial modeling package would succeed at the expense of Lotus. Sales languished, forcing Javelin to lop nearly $600 from the package's price as part of a continuing special promotion.

Users argue that the threat of clones is a situation Lotus itself created. Many users turned to clones of 1-2-3 after Lotus pulled the original version off the market and substituted a version that was not fully compatible with the existing 1-2-3 base.

Many software executives contacted last week say they believe the lawsuits are damaging. "I think it is a bad thing. We should worry about perfecting technology and not worry about suing each other," says Ron Posner, president of Ansa Software.

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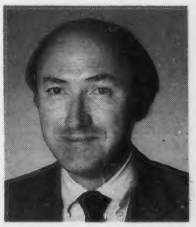

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IBM finds friends in bid to influence

From page 1

Groupe Bull, under the auspices of the French standards organization, will propose that elements of IBM's peer-to-peer networking protocol, LU6.2, become part of OSI transaction processing specifications that the subcommittee hopes to hammer out by June. An earlier IBM proposal to include elements of LU6.2 in the American National Standards Institute's (ANSI) OSI recommendations was rejected.

The subcommittee, an organization of 21 representatives from standards bodies in Europe and North America, will meet in Paris to discuss at least two rival proposals defining basic transaction processing services, such as how to send and receive data, perform updates and send acknowledgements and error messages.

One set of specifications that does not conform to LU6.2 was co-authored by John Neumann, vice-president of Vienna, Va., research firm Omnicom, Inc. and submitted by ANSI; the other, submitted by the IBM-Siemens-Bull triumvirate, is an exact replica of LU6.2, Neumann claimed. "There is going to be a fight," he said.

Short vs. long run

While an IBM victory should benefit users in the short run, in the final analysis, the industry — and ultimately the users — would lose out, according to Connecticut Mutual Life Insurance Co. data processing officer William Burroughs.

"As a business user, I like the idea of LU6.2 becoming an industrywide standard because we want vendors to coordinate around a communications standard and bring standardized products to market as quickly as possible," Burroughs said. "But if the computer industry follows IBM into the fold, this eliminates opportunities for IBM's competitors to bring out products that are *better* than IBM's."

The insurance company has made LU6.2 support a prerequisite for minicomputer systems that are currently being evaluated for a future distributed data base project. "I don't see anything today that's better or more defined," Burroughs admitted. Nevertheless, he expressed concern that LU6.2 incorporation into OSI would "cause trouble for us in the long run, especially if we choose Digital Equipment Corp. systems. Standardization has to be flexible or it stifles."

The outcome of the battle will determine transaction processing protocols that will become the basis for an Open Distributed Architecture (ODA) that would work with OSI protocols. ODA would define peer-to-peer communications protocols that correspond closely to LU6.2 protocols, according to Neumann.

"Right now, nothing in OSI performs application-to-application functions such as data base updating; it provides file transfer only. You can update a file on another system under OSI, but it's a clumsy process," Neumann said. ODA would also pave the way for a multivendor distributed data base system under OSI.

IBM chose to submit its LU6.2-based transaction processing document through France's standards organization only after it tried and failed to get it incorporated into ANSI's submission to ISO, according to Neumann. The European Computer Manufacturers Association (ECMA), a vendor consortium that develops specifications that are often incorporated into the final OSI standards, also declined to implement LU6.2 in its own specifications in May.

ECMA is still willing to incorporate LU6.2 into OSI, however, according to Christopher Cheetham, a manager for business development at European computer manufacturer ICL PLC. Adopting IBM's protocols as part of OSI might avert a situation feared by more than one computer vendor — Big Blue nominally supporting industry standards while putting its weight behind its own proprietary protocols. "IBM is the only vendor that could do that," Cheetham noted.

On the other hand, ECMA wants to ensure that IBM does not retain control of its protocols once they become part of OSI. "ICL would very much welcome early standardization in this area, provided that we can have an open standard under control of the public domain — not of a single supplier," Cheetham emphasized.

"The only reason ECMA rejected the protocol in May was because we couldn't agree with IBM on how to allocate control of the standard," he said. The Paris meeting will be an opportunity for standards bodies such as ECMA to reopen negotiations with IBM on this issue.

Low profile

IBM has carefully maintained a low profile on the LU6.2-standard question ever since the well-publicized ECMA debacle. "ECMA invited us to submit LU6.2; we never proposed it ourselves," IBM spokesman Paul Neuman said. Bull, IBM and Siemens are proposing incorporation of "certain basic LU6.2 communications functions, such as allocating a conversation, confirming receipt of data and requesting to send," Neuman said.

"This would be a positive development for LU6.2," he admitted, adding, however, "There is nothing threatening about LU6.2; it is simply a programming tool that enables communication between two different computers."

The objective of the next meeting of the subcommittee, to be held in Japan in June, will be to define the actual specifications for the transaction processing standard. This may not be a realistic goal, however, Omnicom's Neumann claimed. "But by the end of 1987, we should have the protocol specifications." The next step will be a series of ballots that could take as long as two years before the standard will be finalized, he added.

DEC to go after IBM market with clustered designs

By James Connolly

NEW YORK — Digital Equipment Corp., which three years ago backed out of the mainframe business when it let its Decsystem 20 series die, reportedly will take a new aim at the IBM data center market tomorrow with clusters of its VAX 8700.

DEC has scheduled an announcement for its Wall Street branch office, leading analysts to speculate that the company will introduce clustered configurations of four and possibly eight VAX 8700s. The VAX 8700, rated at about 6 million instructions per second (MIPS), was introduced in August as DEC's second most powerful machine.

DEC reportedly will bill the clustered systems as competitors with the higher end of IBM's 3090 mainframe family, the 3090 Model 200 and the 3090 Model 400.

An executive with a DEC competitor speculated that the clustered VAX 8700s could perform 25 MIPS with four CPUs and 50 MIPS with eight CPUs.

However, Richard Mikita, director of processor programs for the Framingham, Mass.-based market research firm International Data Corp., observed that the MIPS ratings for the new systems will depend on how they are configured.

He said a key factor will be whether DEC modifies its VMS operating system to present a single image — the way IBM does with its multiple-processor systems — rather than having four CPUs running independently. He also questioned whether the configurations would have one CPU acting as a master, with all jobs moving through that CPU before being run by the slave processors, or if all of the CPUs would be symmetrical.

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STC clears tax hurdle

LOUISVILLE, Colo. — Storage Technology Corp. (STC) apparently cleared the final hurdle to emergence from Chapter 11 bankruptcy protection last week when a federal bankruptcy court ruled that STC's maximum federal tax liability was $22.8 million.

The amount was less than the $25.2 million liability projected by STC and much less than the $640 million that the Internal Revenue Service claimed STC owed in back taxes, interest and penalties [CW, Dec. 15].

The $22.8 million includes $20.1 million owed by STC between 1977 and 1984 and $2.7 million owed by its subsidiary, Documation, Inc. STC Chairman Ryal Poppa said the company was pleased with the ruling.

— Clinton Wilder

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Wordstar upgrade bids to win back market

By Peggy Watt

SAN RAFAEL, Calif. — Die-hard Wordstar users say they are glad to get an upgrade after more than three years, but Micropro International Corp.'s efforts may be too late to glean enough new users to return the flagship product to its former status.

Wordstar 4.0, announced last week and scheduled to be available in February, features more than 125 enhancements, including an UNDO command, macros, path support for subdirectories, some calculation features, more printer drivers and some on-screen text formatting, according to Micropro and early evaluators.

The new version also includes a 220,000-word Word Finder thesaurus from Microlytics, Inc., an 87,000-word spelling dictionary, enhanced Mail Merge and indexing programs. Specialized legal, medical and financial dictionaries are available separately.

A single-user version is $495, and a local-area network file server version is $595, with node versions for $150 each.

Upgrades will be available for $89 to Wordstar users, who must report their software's serial number but need not return the disk. Those who bought Wordstar after Dec. 1, 1986, will receive a free upgrade.

Even Micropro President Leon Williams expects the first takers to be the Wordstar faithful rather than new users.

"There are a lot of users out there who haven't gotten much software from us lately," he says. Williams adds that an upgrade will be available for Digital Research, Inc. CP/M versions of Wordstar this year.

Eisen Chao, information center director for Chicago Title & Trust Co., says the company has stayed with Wordstar on more than 200 personal computers.

"It's still on the approved list, even when some of the new, popular programs aren't," Chao says. He adds that he prefers Wordstar's nondocument mode for programming.

The mass upgrade policy is particularly inviting, he adds. "Not having to send back our disks will help," he says. "We're still in the process of getting our Lotus upgrade" from a year ago.

'Back in the market'

"I think it's going to put them back in the market," says John Conrod, systems analyst for Pacific Bell in San Francisco, which has nearly 3,000 Wordstar users.

"We reluctantly stayed with Wordstar over the past years because, while it lacks some features, it was one of the most compatible for ASCII conversions or imports to and from spreadsheets," he says.

But industry analysts who approve of the new features also say the update may be too late.

"Micropro has a tough row to hoe," says Bill Higgs, software analyst for Infocorp, a Cupertino, Calif., market research firm. "If users are still with Wordstar, they're probably hard-core and will upgrade. I think Micropro will probably have a pretty healthy conversion rate. But the new customers will probably not be enough to vault them back to number one."

Micropro is beckoning new buyers with a rebate offer of $100 cash back or $300 worth of utility programs, including Borland International, Inc.'s Sidekick and Ready from Living Videotext, Inc.

The new features, while substantial, are limited enough to keep from infringing on Wordstar 2000, Micropro's high-end word processing package, Higgs adds. "They don't want to cannibalize that product."

The caution of protecting Micropro's other products cripples Wordstar, according to Tim Bajarin, vice-president of the microcomputer research division of Creative Strategies Research International in San Jose, Calif.

"They haven't really taken it to third-generation word processing" by adding sophisticated page formatting and publishing features, Bajarin adds. "I think that's a mistake. Wordperfect, Microsoft Word and others are leapfrogging Wordstar. We should have had this upgrade a year ago."

CEO deserts Datapoint

By Clinton Wilder

SAN ANTONIO — Struggling Datapoint Corp. suffered another setback last week when President and Chief Executive Officer Edward P. Gistaro resigned unexpectedly, citing personal reasons.

A corporate statement said Gistaro, 51, declined to discuss his future plans.

Gistaro had been with Datapoint for 13 years, and he had also served on the company's the board of directors for 10 years.

Interim CEO named

Executive Vice-President and Chief Operating Officer Doris D. Bencsik, 55, was appointed interim CEO until a permanent replacement is named by Chairman Asher B. Edelman.

Bencsik joined Datapoint in 1982 after holding positions at Data General Corp. and Honeywell, Inc.

Gistaro's departure came less than two months after John L. Hale unexpectedly resigned as president of Intelogic Trace, Inc., which was Datapoint's former service division that Edelman spun off as an independent company in 1985 [CW, Dec. 8].

Datapoint reported a loss of $4.5 million on revenue of $71.4 million in its most recent quarter that ended Nov. 1.

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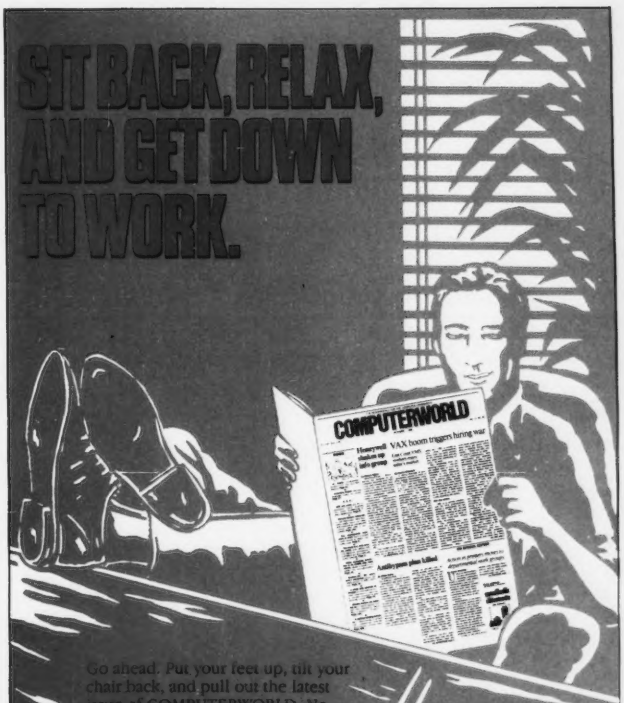

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3317-8703

Enmasse aims Unix systems at commercial DP market

By James Connolly

ACTON, Mass. — Enmasse Computer Corp. is expected to introduce its second generation of Unix-based systems this week with the announcement of a multiprocessor designed to support more than three times as many users as Enmasse's 1-year-old ECS1000.

The Acton-based company is scheduled to announce the ECS2000 at Uniforum 1987, The International Conference of Unix Users in Washington, D.C.

Like the ECS1000, the ECS2000 is based on Motorola, Inc.'s 68020 microprocessor. However, the newer system reportedly features backplane and memory controller modifications designed to provide full 32-bit processing and data flow, rather than the 16-bit data flow of the ECS1000.

Tom Perry, Enmasse vice-president for sales and marketing, said the modifications also allow the addition of up to 120 user connections to each application processor in the ECS2000, compared with 32 connections per application processor in the ECS1000. Application processors and user connections reportedly can be added in increments. With the connection of up to 24 application processors to the central file processor, the ECS2000 supports up to 2,880 users. Enmasse claimed the ECS2000 performs an aggregate of 200 million instructions per second (MIPS), but Perry said the processors perform about 6 to 7 MIPS on a single job.

The ECS1000 reportedly can be upgraded to an ECS2000 in the field. Both systems run EOS, which is Enmasse's version of AT&T Unix System V.2.

An entry-level, eight-user ECS2000 configuration costs $29,900 and includes 6M bytes of memory, a 172M-byte disk drive, a cartridge tape drive and an EOS license. Support for more users can be added in eight-user increments at a cost of $400 per user. Perry said a mid-range system would cost $60,000 to $120,000 and a high-end system could cost more than $1 million.

Uniforum '87

Firm readies automation tool

Targets burgeoning computer-aided mart

By Mitch Betts

WASHINGTON, D.C. — A veteran California software firm will leap into the computer-aided software engineering (CASE) market this week with the first in a family of products for automating the software development process for general business applications.

Caseware, Inc. will introduce Amplify Control, a Unix-based software development environment for large systems, at Uniforum 1987, The International Conference of Unix Users, here.

Officials said the product automates the management and organization of software development and will be followed by integrated modules that automate software design, project management, documentation, support and software building.

The CASE market, which analysts expect to grow to nearly $1 billion in 1990, is predicated on the MIS manager's interest in improving programmer productivity and reducing the costs of software development and maintenance.

David W. Bernhardt, president of the Costa Mesa, Calif.-based firm, said in an interview that Amplify Control is the first CASE product for general business systems, rather than vertical markets.

Initially, Amplify Control will run on Sun Microsystems, Inc. Sun-2 and Sun-3 workstations and is intended for producing software in the C language. It will be modified to run on other workstations and to develop code in other programming languages, the vendor said.

Amplify Control integrates several of the software development tasks — such as the coding, testing and debugging cycles and configuration management — into a uniform environment.

The environment features the use of windows, a mouse and a graphics-oriented user interface so users can graphically navigate through the software system by viewing structure diagrams and then access source code directly through these diagrams, according to the vendor.

Other features include a version control facility, automatic generation of Unix "make files" to update software development information, a structure diagrammer and a security facility, the vendor said.

Version control major concern

Bernhardt said that version control is one of the biggest concerns of MIS managers because of the high cost of distributing software that contains errors.

"It only takes one file that is not updated properly for you to have a bad release. If you've ever been on the receiving end of a bad release, you know how bad it is. If you've ever been on the giving end, it's a nightmare," Bernhardt said.

The next module to be released, Amplify Design, will enable programmers to create and link data flow diagrams and structure diagrams but cannot translate diagrams into code, Bernhardt said. The last module, Amplify Build, is expected to use artificial intelligence techniques to generate code and will be released in two to three years, he said.

Amplify Control will be licensed to end users at a cost of $7,800 per workstation CPU, with volume discounts available. Shipments are scheduled to begin in early April.

Until last month, Caseware was known as Computers West, Inc., an applications software developer founded in 1976. Bernhardt changed the name to reflect the firm's new thrust into the CASE market.

Sun, Applix, Televideo prepare Unix introductions for conference

Major hardware and software vendors are expected to announce significant Unix-oriented products at this week's Uniforum 1987, The International Conference of Unix Users in Washington, D.C. Below are a few announcements unearthed last week.

■

Sun Microsystems, Inc. will introduce an expandable, low-end monochrome workstation and a 141M-byte disk drive on Tuesday at Uniforum 1987.

The Sun-3/140M, with a base price of $12,900, comes with 4M bytes of main memory and can accommodate up to 282M bytes of local mass storage. Less than a year ago, the vendor introduced the Sun-3/50M, a low-end monochrome workstation that could be purchased as a diskless system or as a hard-disk version with a 71M-byte capacity.

Beyond expanded storage capacity, the workstation has been designed to allow users to add up to four optional Sun boards.

The 141M-byte disk drive will be offered with all Sun-3/50 and Sun-3/100 systems and costs $6,900. A mass-storage subsystem version, which would include a 60M-byte ¼-in. cartridge tape, costs $8,900.

Sun will offer a packaged version of its 3/50M with the new disk drive for $15,500. The 71M-byte hard-disk version had been introduced for $13,900 last February.

Rose Hamilton

■

In a move aimed at tapping the software market for the large base of Intel Corp. 8088-based microcomputers, Applix, Inc. will announce PC-Alis this week.

PC-Alis is an optional feature of the Alis system that lets users of IBM PCs and compatibles access Alis's integrated office automation software. "You can run part of Alis on your DOS PC and part of Alis on your host and get access to a full work group computing environment," said John Butler, vice-president of sales and marketing for Applix.

A host system, such as NCR Corp.'s Tower family, Digital Equipment Corp.'s VAX family or a workstation file server, is required to run PC-Alis. The PC is linked to the host through Ethernet.

PC-Alis will be available this week and costs $495. The cost of the Alis host package will begin at $1,945.

■

Televideo Systems, Inc. will announce this week three computers that can act as multi- or single-user systems.

The firm will formally unveil the Telenix 386, which serves eight to 16 users and is three times as fast as the IBM Personal Computer AT, a company spokesman claimed.

Telenix 386 is based on the Intel Corp. 80386 microprocessor and will come standard with 2M bytes of random-access memory, expandable to 16M bytes, and expansion slots, the spokesman said.

The system will also include a version of Unix and Merge 386 from Microport Systems, Inc., which gives the user the ability to toggle between Microsoft Corp.'s MS-DOS and Unix applications and run those applications concurrently.

All three announced systems will come standard with serial and parallel ports, a proprietary controller for hard disks, a 14-in. high-resolution graphics monitor, a 1.2M-byte floppy and MS-DOS 3.1.

Douglas Barney

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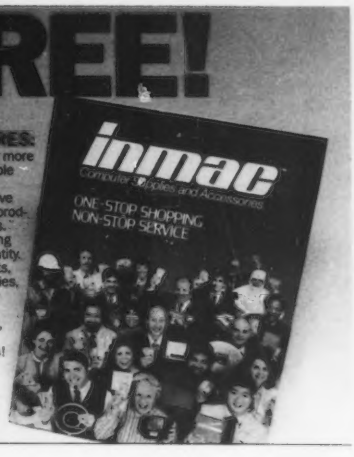

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Alliant boosts performance with enhancements to FX/8

By Donna Raimondi

LITTLETON, Mass.— Alliant Computer Systems Corp. last week announced enhancements to its FX/8 parallel processing systems that are said to improve performance up to 56% on some applications and to increase disk I/O throughput by 400%.

The 4-year-old firm, which completed a $30 million public common stock offering in December, announced compiler, operating system and hardware enhancements to the FX/8 scientific system. These enhancements include a new version of the FX/Fortran compiler, disk striping, which is a form of parallel I/O, and a four-times-larger — now 512K-byte — and more advanced cache memory, according to Alliant.

The disk-striping feature seems to have generated the most interest in users. "It's very important for image processing applications," said FX/8 user Keith Miller, manager of the computing technology section at The Analytic Sciences Corp. (TASC) in Reading, Mass. The ability to transfer data in parallel will allow overlaying pictures on top of other pictures, he said.

Disk striping is an operating system feature that distributes individual files across up to four disks, each with its own controller, and allows access to all disks in parallel. Alliant said four-way striping provides a 400% improvement in disk I/O throughput over the existing one-disk-controller system. Striping is said to be most advantageous to users with high I/O requirements, as opposed to users whose programs are CPU-intensive.

Chips updated

A new interactive processor — the unit that executes interactive jobs and performs I/O and operating system functions — contains Motorola, Inc. 68020 chips instead of the previous processor's Motorola 68012 chips and will deliver twice the computational performance of the older processor at the same price, Alliant said.

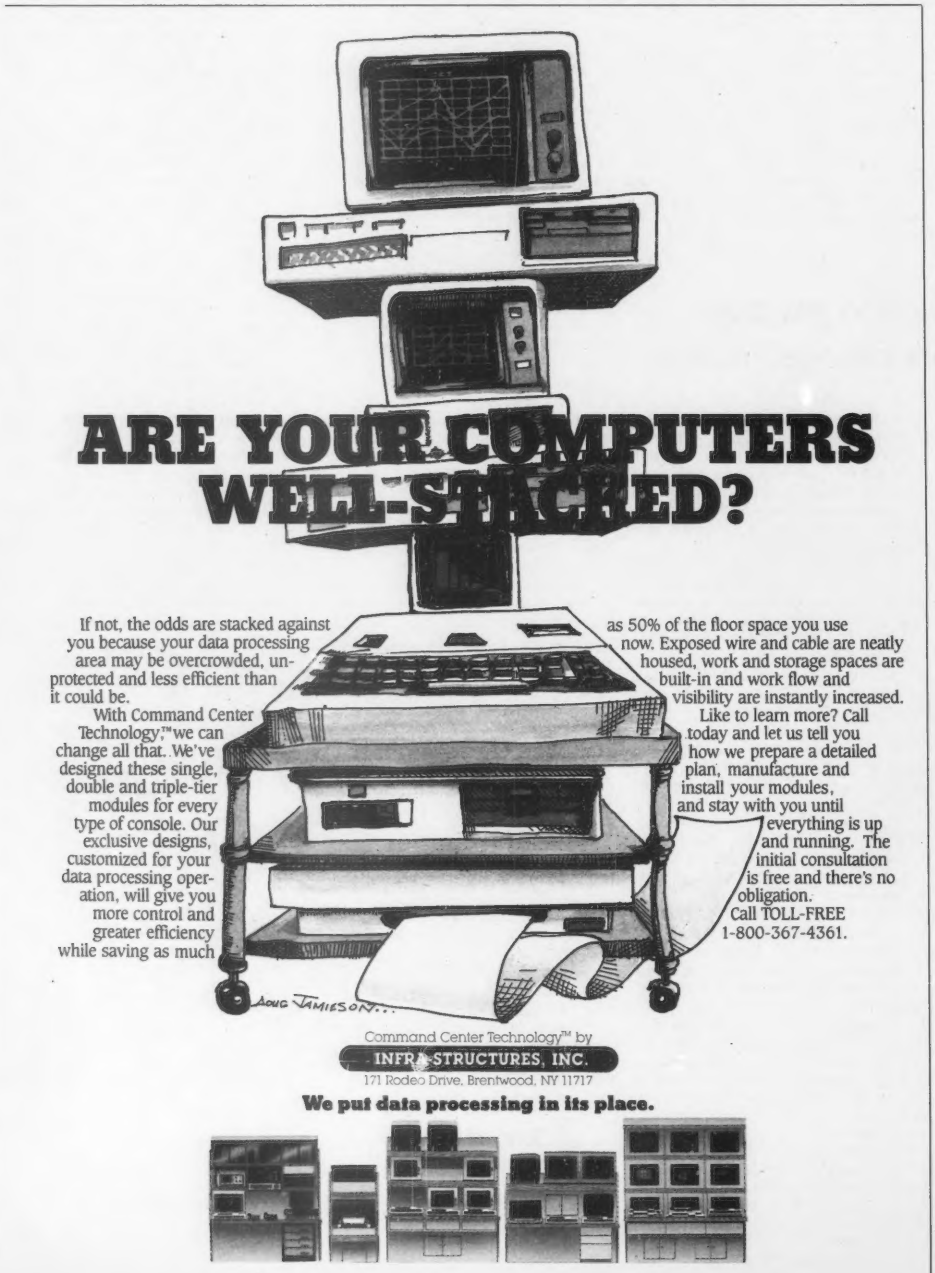
The increased cache allows up to eight computational elements (the parallel processor units) to deliver more of their peak performance when executing a single large job in parallel.

For Miller, whose FX/8 has three computational elements and four interactive processors, the enhancements could speed up jobs. When TASC got the FX/8 in July, it discovered speedups from four to 30 times that of the Digital Equipment Corp. VAX-11/780 it had before. "A 512K-byte cache would help us. If there is a bottleneck in the machine, I think it is still in the cache," Miller said. Analytic Sciences' system has a 128K-byte cache.

Version 3.0 of the FX/Fortran compiler optimizes a broader range of source-code constructs and algorithms, Alliant said. Delivered performance on the Supercomputer Linpack benchmark increased 56% to 25 million floating-point operations per second.

All systems purchased now will ship with the new cache and interactive processors; the software has begun shipping. The company has upgrade packages for the new cache, priced at $30,000 per 256K-byte board, and interactive processors, costing $3,500 each, that will ship in the second quarter.

The FX/Fortran Version 3.0 and Version 3.0 of Alliant's Concentrix operating system, needed for the disk striping, are supplied to current customers at no additional charge under existing software maintenance contracts. To use the disk-striping feature of the operating system, users need a disk controller, priced at $5,000, for each additional stripe.



Prime to premier processor for science market

By Stanley Gibson

NATICK, Mass. — Seeking to boost its standing in the lucrative scientific and engineering markets, Prime Computer, Inc. will introduce a minisupercomputer that uses parallel and vector processing techniques in the second quarter of this year.

The processor, priced at less than $1 million for a full installation, will go head to head with the machines of Alliant Computer Systems Corp. and Convex Computer Corp. The first customer installations are expected late this year.

"It's a minisupercomputer optimized on numerical performance. It's about 10 times as fast as a superminicomputer but is priced at one-tenth the price of a Cray," said Carl Ledbetter, Prime's vice-president of scientific computing, in a news briefing in advance of the product's formal announcement, referring to Cray Research, Inc. supercomputers.

The machine will run at 40 nsec, will be air-cooled with a fan and will require no exotic parts, Ledbetter said. The computer is now in development test by its manufacturer, Cydrome, Inc., formerly Axiom Computers, Inc., located in Milpitas, Calif.,

Continued on page 14

Retailers decentralize with micro-based in-store systems

Use tools to organize schedules, payroll

By Alan Alper

NEW YORK — Decentralization, the buzzword of the data processing industry, is beginning to make its way into the lexicon of retailers, as small and large businesses alike begin adopting microcomputer-based systems to handle everything from point-of-sale (POS) to financial and administrative applications.

At the National Retail Merchants Association (NRMA) Conference held here last week, retailers talked about the virtues of microcomputers, standards in the electronic delivery of documents and the need for better software tools for analyzing data collected by POS systems.

While some smaller retailers were looking for their first POS system, medium-size to large retailers were evaluating second-generation equipment, much of it micro-based, and offering enhanced connectivity to corporate data bases residing on mainframes at headquarters.

'Allow more efficiency'

"In-store processing is the direction more and more retailers are going," noted Kathleen Gette, an MIS consultant with Arthur Young in New York. "Micros allow each store to collect more data and to be more efficient."

Indeed, micros are having an immense impact on productivity at Marshall Field & Co. in Chicago. The mass merchandiser has recently begun using a microcomputer-based system to improve customer service by linking staffing to store traffic.

"Marshall Field believes fervently in the concept that our service level at the point of sale is a crucial element in maintaining and increasing our competitive advantage over other traditional department store retailers within our trading market," said Walter Brown, vice-president of productivity and staffing.

The firm is using a package designed by Garr Consulting Group in Marietta, Ga., which runs on IBM Personal Computer XTs, ATs and compatibles, to set sales agents' work schedules, breaks and revenue goals. By using a computer to handle scheduling, the department store chain hopes to free middle management of mundane tasks, allowing staff members to more effectively manage their departments.

The computerized scheduling system is a signficant and first step in developing an integrated payroll management system within each store, Brown said. Marshall Field expects to install a timekeeping system running on the same micro as the scheduling package at each store, he added.

Encoded badges

The system will use encoded card badges, which when inserted into a card reader will provide daily, weekly, pay period, week-to-date and pay period-to-date information by worker and expense center. This data will be sent to the corporate payroll system via modem.

Other retailers, such as Hechinger Co., a Landover, Md., household goods chain, seek better software packages for in-store POS systems.

"We view that technology as providing us with a competitive edge," said Robert DeMarcos, vice-president of MIS at Hechinger.

DeMarcos also said his company is evaluating the feasibility of using electronic data interchange. "It would enable us to put through purchase orders faster and more accurately," he added.

Continued from page 14

according to Ledbetter.

"I think that they [Cydrome] will be successful. But were it not for their relationship with Prime, they would be too late," offered Jeff Canin, industry analyst with Hambrecht & Quist, Inc. in San Francisco. Canin said the minisupercomputer field is becoming crowded and that Prime's marketing muscle will help the new computer to compete.

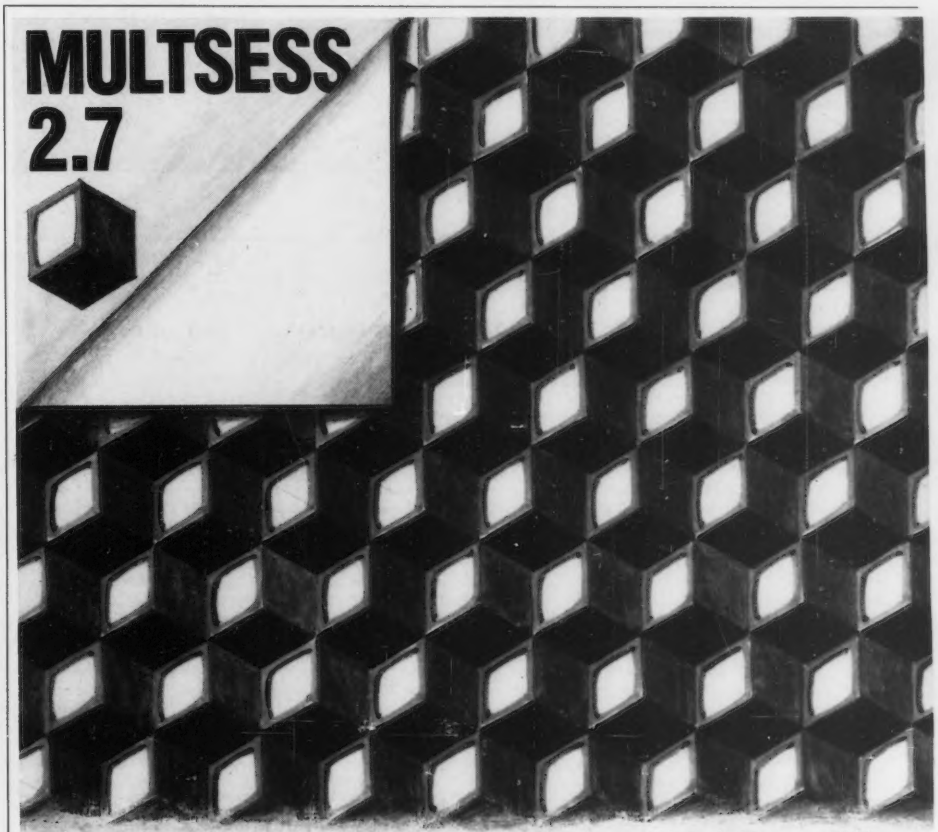
A Prime spokesman termed the relationship between Prime and Cydrome a joint development and marketing agreement under which both Prime and Cydrome will sell the product.

Ledbetter said the machine performs between 6 and 20 sustained million floating-point operations per second harmonic on the Livermore Loop and, according to that measurement, outperforms other minisupercomputers currently on the market.

The computer runs AT&T's Unix System V Release 3. The 64-bit computer processor will have a Fortran compiler and will support Ethernet and Transmission Control Protocol/Internet Protocol.

Prime said it hopes to sell the computer to users of Prime computer-aided design and manufacturing (CAD/CAM) systems for testing models created on the CAD/CAM system, in much the same way that Alliant computers are sold with Apollo Computer, Inc. workstations.

Ledbetter also hinted that Prime will introduce an advanced workstation that will complement the product later this year.



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VIEWPOINT

EDITORIAL

Declaration of independents

There's a foul smell emanating from Section 1706 of the Tax Reform Act of 1986. As of this writing, the government is still trying to determine the most politically expedient interpretation of this section. While the drama unfolds, independent programmers and computer consultants are in limbo.

Section 1706 threatens the status of the independents, or so it would seem. The problem is that no one seems to know whether it applies only to independents working through brokers, to those working directly with clients or to both. Since the section took effect Jan. 1, this interpretive uncertainty is causing problems. Reports have surfaced of some employers holding portions of independents' pay in escrow against possible tax payments. Others are simply putting contractual arrangements on hold until the government can make up its mind.

No matter how one slices it, Section 1706 was ill conceived at best. To begin with, it is unclear just how it got into the tax code. The more closely its genesis is viewed, the more it looks like Section 1706 was thrown into the reform hopper the way one tosses *TV Guide* into a shopping cart at the checkout counter. It's just another item.

Further, Section 1706 is curiously selective in terms of whose loopholes it attempts to close. Specifically, it applies to "an engineer, designer, computer programmer, systems analyst, or other similarly skilled worker." Independents working in nontechnical fields are safe from its grasp.

It is likely the tax reformers had it in mind to deal with the scores of programmers who, while functioning for all intents and purposes like permanent, full-time employees of one primary employer, exploited so-called safe harbor provisions and reaped the tax benefits of independent businessmen.

There is no questioning the merit of tax reform that brings scofflaws in line. But there are thousands of innocent independents who may get sucked under by a reform undertow originally intended to close select loopholes.

National politics being what they are, it appears the development of Section 1706 involved cloakroom antics as much as anything else. During the long debate on the sweeping Reform Act, Democrats sought tax cuts for certain groups in their constituencies. The Republicans essentially said, "Sure, you can have some cuts. Just make sure they are matched by increases in other areas so we don't embarrass our president with even larger deficits."

If there was one group to exploit, it was the hundreds of thousands of independents who seldom speak, that is, lobby, with a common voice. The problem is they are speaking up loudly now. So Sen. Daniel P. Moynihan (D-N.Y.) last month summoned a special task force composed of congressional, treasury and Internal Revenue Service folk to arrive at an equitable intepretation of their own rules.

After all is said and done, what does the government estimate it will reap in extra taxes from Section 1706? An average of about $12 million a year over the next five years. That's what the federal government spends every eight minutes of every day, 24 hours a day, seven days a week. So it's small potatoes to congressional reformers — unless the independents squawk loudly enough.

LETTERS TO THE EDITOR

What VAX programmer shortage?

With regard to the article, "VAX boom triggers hiring war" [CW, Dec. 1], will someone please tell me where this shortage of VAX programmers is?

In 1980, I entered the University of Oklahoma as an electrical engineering major. My first electrical engineering class was in Fortran, and I punched cards for six weeks before I was given an account on the Digital Equipment Corp. PDP-11/70, which was the heart of the engineering computer network (ECN).

From then on, I did all of my classwork on the 11/70 or one of the two VAXs available to me and, except for the semester I took Cobol, having since changed majors to computer science, I never again had to deal with IBM. (My Cobol work was submitted through an remote job-entry link from the 11/70.) During my sophomore year, I was hired as a student applications analyst on ECN, working on what became an 11/70 and 11/780 network serving more than 80 terminals.

I left the university in 1984 for Southeastern Oklahoma State University, where I once again worked on an 11/70, this time running RSTS/E. In 1985, I was hired as a systems programmer by SOSU and was involved in the installation and configuration of the school's new VAX 11/785 with VMS. I was in charge of installing and maintaining Eunice, a layered product that emulates the Unix environment, and worked on both hardware and software until my graduation in December 1985.

The purpose of the above educational history is not to blow my own horn but to give an idea of what type of training goes into a bachelor's degree in computer science these days. I have applied again and again to shops using DEC equipment, only to be turned down because I lack "experience." More than five years' work on DEC systems doesn't even qualify me as a VAX operator, according to one firm. There's always someone else who is better qualified for the position.

So, if there is really a shortage of VAX programmers out there somewhere, could you let us know where it is? I'm certain that I am not alone in this situation, and we would welcome the opportunity to apply and expand upon our DEC skills before they are allowed to atrophy. Give us a chance — you'll find that "entry level" has taken on a whole new meaning.

Brad J. Southers
Kawneer Co.
Denison, Texas

AT&T Mail offers editable E-mail . . .

The article, "MCI, Lotus to co-announce editable E-mail" [CW, Dec. 1], citing a communications project manager, claims that the companies' joint offering is "the first time a public electronic mail service will be able to handle anything beyond plain ASCII text."

This statement is inaccurate. AT&T's electronic mail service, AT&T Mail, has always had this capability, up to and including the delivery of executable binary files.

Mark Siegel
Manager, Media Relations
AT&T
Basking Ridge, N.J.

. . . as does GE's Quik-Comm System

The story, "MCI, Lotus to co-announce editable E-mail," reported that the introduction of Lotus Express allows, for the first time, "a public electronic mail service to handle anything beyond plain ASCII text."

In comments before the Electronic Mail Association's annual meeting in Washington, D.C., on Dec. 3, General Electric Information Services Co. Vice-President John Sidgmore reminded attendees that GE Information Services, in January 1985, offered the ability to simply and easily transmit binary files, including Lotus Development Corp. 1-2-3 spreadsheets, over its Quik-Comm System global electronic mailbox service.

David M. Page
Manager, Business Communications
General Electric Information Services Co.
Rockville, Md.

Quality is productivity's wellspring

Gopal Kapur's article, "Productivity tools betray promises of MIS nirvana" [CW, Dec. 1], was absolutely on target. The current euphoria focusing on faster code generation really does strike me as confusing quantity and quality in programming.

As any manufacturing shop that has embraced statistical quality control will attest, focusing on quality is the real wellspring of productivity. Yet computer-aided software engineering (CASE) tools that incorporate early life-cycle error detection and address program quality are extremely underrecognized in MIS shops today.

Continued on page 18

VIEWPOINT

Learning how to profit from the EDP audit experience

Honestly, now. When an electronic data processing (EDP) auditor walks into your office, you:

(a) panic and dash for the exit.
(b) grin and bear it.
(c) welcome the visit.
(d) don't know — never happens in your organization.

Anyone who checked (c) can turn the page. Unfortunately, I imagine most of you are still reading.

If you checked (a), you can turn the page, too. In fact, you can close the whole paper. You've got bigger things to worry about. Like the name of a good lawyer.

Now we've got the "grin and bear its" and the "don't knows." A "don't know" answer isn't your problem. It's your management's. Unless they're asleep, you won't be able to say "never happens here" for long.

The managerial majority

That leaves the "grin and bear its." You are the majority. Most MIS managers rank an EDP audit with a bad case of hives or having a tooth pulled. That's too bad, because it doesn't have to be that way.

An audit is a review with a fancy name. The focus of an EDP audit is on control of the computer system. Can management be certain it is under control? Do applications work the way the business should run? Is access to sensitive data restricted? Is shipment data seen by different managers consistent? Surely no MIS manager can object to any of these. If an audit helps reach these ends, it should be welcome.

By EFREM MALLACH

"EDP audits should be of value, both to the MIS manager and to the business unit the system serves," says Polaroid Corp. assistant manufacturing controller Peg Gavenonis of her own experience as an auditor. She continues, "The time dedicated to an EDP audit must have profitable results that yield a more efficient and effective system and one that will provide information fit for management's use."

MIS managers are human, though. Nobody likes good advice no matter how useful it ought to be. Hence, much of the resentment of the audit. Sure, it's good for you. So is cod liver oil. But being good for you doesn't make it taste good.

To make an audit more palatable, Phelps Dodge Corp.'s Corporate Vice-President for MIS Michael Cangemi suggests looking at the example of accountants. Accountants know their work will be audited because it has been for the better part of a century, he points out. They know what auditors want. They set up their systems to be auditable and to pass audits.

Cangemi, who is a past president of the EDP Auditors Association and previously headed EDP auditing for Phelps Dodge, says MIS personnel must take on the conceptual responsibilities that accountants have assumed for decades. "DP management has to realize that they are responsible for computer controls," he says. "If they accept that, they will welcome the auditor as the second best way to see if their systems are well controlled. The best way is for them to do it themselves."

Once MIS managers accept this responsibility, an audit will be a chance to exchange thoughts, show off a little and pick up a few new ideas. Looking at it this way, an audit can hardly be compared with a visit to the dentist.

A wish list

No doubt, everyone has a wish list of what they would like to see happen on the way to this nirvana:

- All auditors must be able to carry out a basic test of EDP operations, which will free the more specialized EDP auditors to function in a more consultative role.
- EDP auditors, in turn, must think like managers and apply their skill to management problems.
- MIS managers must get up to speed on control, security and quality assurance topics.

Doing so is tough, as there is never enough time. The list of topics on which MIS managers must get up to speed is long. Training is hard to find. EDP Auditors Association programs are good, though they are usually aimed at auditors themselves. Learning what is required, however, is not an impossible dream.

With an attitude shift and the learning, EDP audits would be less of a nightmare. They could move up from "barely tolerable" to "well worth the time."

Compared with much of what we do at work, that's pretty good.

Mallach is associate professor of computer science at the Boston College School of Management and a consultant to top managers of vendor and user organizations.

Federal rebuttal: Security policy won't affect private sector

READER'S PLATFORM

By DONALD LATHAM

A news article and editorial that appeared in the Nov. 24 issue of *Computerworld* contain several inaccuracies I would like to correct and clarify. The statements in question appeared in the front-page article entitled, "Feds sound Red alert on data," and in the accompanying editorial entitled, "For our eyes only."

The news article, in an apparent reference to National Telecommunications and Information Systems Security Policy No. 2, "Protection of sensitive, but unclassified information in federal government and automated information systems," erroneously claims that, "In essence, the National Security Decision Directive (NSDD) 145 created a security level below the national security classifications of top secret, secret and confidential."

Neither the policy nor NSDD 145 establishes a new category of classified information. Indeed, the foreword to the policy states that the definition and requirements to safeguard classified information are addressed in Executive Order 12356, signed by President Reagan on April 2, 1982.

Moreover, the policy does not specifically identify sensitive but unclassified information to be protected.

Federal department and agency heads are responsible for identifying such information that pertains to national security or other federal government interests and ensuring that telecommunication and automated information systems processing of such sensitive but unclassified information is protected against unauthorized access.

The editorial described the Reagan administration's efforts to ensure the security of computer systems that process classified and sensitive information as "chilling" and claimed that "the issue is too critical, too comprehensive and too basic to both the nation and to the practice of technology to leave it in the hands of those within the defense establishment."

> ***'It is essential for, and incumbent upon, the government to initiate measures to prevent the abuse or misuse of [sensitive but unclassified] information by those who would seek to invade the privacy of U.S. citizens, to obtain an unfair advantage in business dealings, to avoid law enforcement efforts or circumvent the intent and purpose of laws passed by the Congress.'***

The interdepartmental structure established by NSDD 145 ensures that the problems of computer security are not left solely in those hands.

In point of fact, the policy protecting government systems that process sensitive information was developed over a two-year period by subcommittees and the working groups of a 26-member interagency government committee — the National Telecommunications and Information Systems Security Committee (NTISSC).

The NTISSC is charged with implementing NSDD 145. A substantial majority of the NTISSC's membership (13 of its 21 members) come from civilian agencies, and even the military departments represented on the committee are, of course, headed by civilian secretaries, in keeping with the American tradition of civilian control of the military.

After the policy was developed and approved by the NTISSC, it was thoroughly coordinated and approved by the Systems Security Steering Group, a Cabinet-level body that was charged by the president with overseeing the implementation of NSDD 145.

The Steering Group is chaired by the assistant to the president for national security affairs and composed of the secretaries of state, defense and the treasury, the director of the Office of Management and Budget, the Attorney General and the director of the Central Intelligence Agency.

The policy reflects a recognition that technological advances have greatly increased the opportunity for unauthorized access to and, thereby, abuse of information.

We believe it is essential for, and incumbent upon, the government to initiate measures to prevent the abuse or misuse of this information by those who would seek to invade the privacy of U.S. citizens, to obtain an unfair advantage in business dealings, to avoid law enforcement efforts or to circumvent the intent and purpose of laws passed by the Congress.

The policy is not intended to and will not affect authorized access to government or government-derived information.

For example, the releasability of information to the media or individuals in response to requests submitted under the Freedom of Information Act is not affected by this policy.

Let me assure you that the policy does not apply to systems in the private sector.

The intent of NSDD 145 and the policies that flow from it is to encourage, advise and assist those in the private sector who want and need to protect their data, but only if that help is wanted.

Latham is the chairman of the National Telecommunications and Information Systems Security Committee.

Continued from page 16

Current-generation CASE tools that integrate analysis, modular design, program specifications and source-code generation, along with early life-cycle error detection, are the solution to the software productivity problem.

CASE tools eliminate much of the dollar- and time-consuming defect-removal process in the test and maintenance phase. They also address such critical issues as design and maintenance backlogs by allowing resources to work efficiently.

Corporations are increasingly dependent on MIS functions to execute critical strategy. MIS directors can ease their resource burdens through CASE tool use.

Forward-thinking MIS directors who use these tools can find real recognition in fulfilling the strategic potential that MIS offers.

Peter M. Craig
President
Promod, Inc.
Laguna Hills, Calif.

On discretionary security

Your article, "System break-ins raise concern over electronic terrorism" [CW, Nov. 24], demonstrates a lack of understanding of computer security. Unix may be insecure, but not "because it is an open architecture."

The problems with Unix have nothing to do with open architecture. The existing Unix security system has serious holes in it, such as allowing users access to security data sets. Even if the security mechanism were tightened, Unix does not provide for discretionary security.

Consider the Multics operating system, which was developed, with Advanced Research Projects Agency funding, by the troika of General Electric Co., Bell Laboratories (which dropped out) and MIT.

Among its design goals was the ability for the user to selectively share data without compromising the data that he wished to withhold and without risking unauthorized changes to data he shared.

In order to satisfy this goal, the early design had to provide for security. The source code for Multics was available to the MIT student body, and students were encouraged to find and report bugs.

Far from compromising Multics security, this openness caused Multics to have much tighter security than it would otherwise have had.

The National Security Agency has certified it as a B level on a scale running from D (most insecure) to A (tightest).

The IBM OS/VS2 MVS operating system, the latest incarnation of OS/360, is also an open architecture, although IBM has announced that future enhancements will be closed.

MVS with a security package was certified at the C level (either C1 or C2, depending on the particular security package). At the time of certification, full source code was available to the public for MVS and Resource Access Control Facility, including the program product versions of MVS, MVS/SP V1 and V2.

The security certifications that Multics and MVS received were not easy — most operating systems have not been or cannot be certified. These systems were among the first to be certified.

I am aware that publicly readable security data, for example, passwords, are scrambled, but in the case of Unix, that turns out not to be much of an obstacle.

I am also aware of the three-level access code for files, but the ability to specify World, Group or Private access does not constitute discretionary access control.

You cannot make the file available to a specific user or to a specific group but only to yourself and the group to which you belong.

Seymour J. Metz
Annandale, Va.

Updating Mother Goose

Many years ago, I invented a Snow White simile.

IBM, under Tom Watson Jr., was the pure little central figure. General Electric Co., still fumbling around in Phoenix, was Dopey. Control Data Corp., founded not long before by William Norris and featuring Surly Seymour as head designer, was Grumpy. It seems to me NCR Corp. was Sleepy, but I'd have to look into my archives to be sure.

Later on, I described Univac as "snatching defeat from the jaws of victory," and Burroughs Corp. as "the secret computer company." And over here I said naughty, naughty things about poor dear ICL PLC.

Time wore on. An ironist with an excessive regard for initials came up with BUNCH, which left out Digital Equipment Corp. And now B and U have eaten each other up, and H, like a fatally wounded brontosaurus, has realized it was killed a decade ago and has made novel arrangements for an Oriental interment.

We need a new simile.

The dwarfs have marched off, singing something a lot less cheerful than, "Hi ho, hi ho! It's off to work we go."

Snow White has hired a thousand lawyers and grown up to be something like the Wicked Queen, intoning, "Mirror, mirror on the wall, who's the toughest of them all?"

I suggest we forget about our Japanese friends and replace the nice Disney tale with a slightly edited nursery rhyme about the five little piggies:

This little pig went to the market [Unisys],
This little pig stayed home [NCR],
This little pig had roast beef [DEC],
This little pig had none [CDC],
And the biggest pig cried, "Sue, sue, sue!" all the way home.

Herb Grosch
Mies, Switzerland

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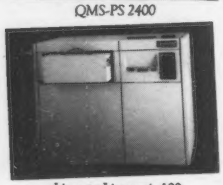
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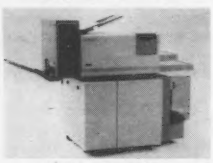
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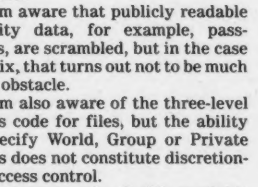
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NETWORKING

MAP, TOP standards gain fresh recruits

By Rosemary Hamilton and Elisabeth Horwitt

PHOENIX — Communication Machinery Corp. and Industrial Networking, Inc. were among the few vendors making product introductions at the Manufacturing Automation Protocol/Technical Office Protocol (MAP/TOP) Users Group Meeting here last week.

Communication Machinery introduced software that implements TOP Version 1.0 protocols on VMEbus- and Multibus-based engineering workstations and on the IBM Personal Computer AT.

Communication Machinery is making available software packages that implement physical, link-level internetworking and transport layers of TOP on existing intelligent on-board 802.3 Ethernet interfaces.

The TOP software runs on Communication Machinery's Ethernet Node Processor (ENP) hardware that also supports Xerox Corp. Network Services and Transmission Control Protocol/Internet Protocol (TCP/IP). The common hardware base provides a migration path to TOP for customers that already have installed networks using the older, multivendor communications protocols, Communication Machinery product marketing manager James Soriano said.

The ENP 10 with International Standards Organization (ISO) Lower Level Protocols implements TOP on VMEbus engineering workstations. The ENP 30 with ISO Lower Level Protocols implements TOP on Multibus workstations. Software for both products is priced at $3,500. For both products, TOP lower layers can be interfaced with upper layers of TOP, including applications such as File Transfer and Access Method (FTAM).

The ISO Protocol Software for ENP 60 implements the first four layers of TOP on an IBM Personal Computer AT running Microsoft Corp. MS-DOS. Priced at $450, The software includes FTAM software and an interface to the IBM PC networking interface Netbios. This enables software pack-

See **STANDARDS** page 21

PC tied to Xenix, VAX

Excelan forms alliances, broadens TCP/IP support

By Elisabeth Horwitt

WASHINGTON, D.C. — Two vendor alliances involving Excelan Corp. are expected to soon release products that allow multiple Microsoft Corp. Xenix System V and Digital Equipment Corp. VAX/VMS systems to act as network file servers for Microsoft MS-DOS workstations.

Scheduled for release by the end of this quarter, the products integrate Excelan's Transmission Control Protocol/Internet Protocol (TCP/IP) Ethernet boards with networking products based on Microsoft's Server Message Block (SMB).

Initially developed for IBM's PC Network, SMB is "a distributed file system that allows users to access and manipulate files transparently on a network without needing to designate which server and what type of operating system they reside on," according to Excelan Vice-President Subhash Bal.

Excelan's boards will be integrated with Santa Cruz Operation, Inc.'s (SCO) Xenix-Net, which implements SMB on Xenix systems, and Syntax Systems, Inc.'s SMB Server/VMS, which implements SMB on VAX/VMS systems. Xenix-Net also enables Xenix systems to act as servers for Xenix-based workstations.

Workstation-to-server file transfer and terminal-to-host communications can be performed using TCP/IP applications File Transfer Protocol and Telnet, respectively. The SMB implementation also allows users to copy files from the server to their workstations. SCO and Syntax's server programs perform format conversion necessary to transfer files from a Xenix or VAX to an MS-DOS workstation.

Excelan's networking board will interface TCP/IP with the IBM PC Network software interface Netbios, enabling software applications written for that interface to communicate using SMB or TCP/IP. Protocols used will conform to the Netbios-

See **XENIX** page 21

Gate links X.25, SNA on net

By Elisabeth Horwitt

CALABASAS, Calif. — Tekeleck, Inc. recently unveiled a multiprotocol translator and an Integrated Services Digital Network (ISDN) Basic Rate interface for its Chameleon 32 Multiprotocol Test and Development System.

The Translator is a multifunctional communications processor that can act as a gateway among a variety of computer and communications environments, including X.25, Ethernet 802.3 and a variety of host protocols, according to Tekeleck.

Support of X.3, X.28 and X.29 terminal controller protocols enables the Translator to act as a packet assembler/disassembler for groups of asynchronous terminals, which can then communicate with hosts over the X.25 packet-switching network,

See **GATE** page 21

PC package runs remote job entry in background mode

By Donna Raimondi

LAGUNA HILLS, Calif.— Network Software Associates, Inc. has announced communications software, named RJE/Background, that allows remote job entry micro-to-mainframe communications and file transfers to take place in background mode while another application runs concurrently in the foreground on an IBM Personal Computer.

RJE/Background allows IBM PC users to connect with a remote mainframe, initiate a remote job entry file transfer operation and continue to use their PCs to run an IBM PC-DOS application or other PC-DOS functions. The requested data is automatically transmitted to the PC's disk or

See **PC** page 20

INSIDE

Baybanks files suit against Yankee 24 ATM network/**20**

Proteon adds token-ring router/**21**

NEW THIS WEEK

- CDC announces its XN line for networks on IBM mainframes

For more on this and other new products, see pp. 59-68.

INSTANT ANALYSIS

"We have made LU6.2 support a requirement for the minicomputer systems we are evaluating; but we're still not sure why we need peer-to-peer communications, although we recognize that LU6.2 does more than just move files."

— William Burroughs, data processing officer at Connecticut Mutual Life Insurance Co.

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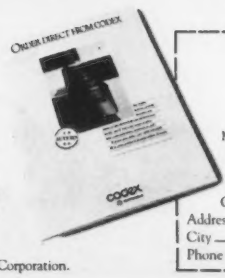

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Bank files suit against owner of proposed ATM network

Says competitors trying to monopolize market

By Stanley Gibson

BOSTON — A change in electronic funds transfer switching charges is the cause of a lawsuit between the owners of two major automated teller machine (ATM) networks in New England.

Claiming unfair competition, Baybanks, Inc., a Massachusetts bank holding company, has filed a complaint in U.S. District Court here against Connecticut Switch, Inc., the operator of a proposed ATM network.

The complaint alleges that five banks structured switching charges "with the specific intent of monopolizing the market for electronic funds transfer services in Massachusetts."

Regional bank network

In November, five of New England's largest banks — Bank of Boston Corp.; Bank of New England, N. A.; Fleet National Bank; Shawmut Bank, N. A.; and State Street Bank and Trust Co. — announced they would band together to form a regional network under the name Yankee 24 that would be composed of 1,300 ATMs.

Baybanks currently operates more than 1,200 machines in its Express 24 network. Baybanks claims the larger banks are joining forces to squeeze it out of the market, despite the fact that the five banks invited Baybanks to join the network.

"It's like being invited to a potluck supper. Our competitors are bringing spinach, and we are bringing the steak," said William Sandalls, Baybanks' vice-chairman.

"They're trying to call it a licensing fee. They're restructuring the processing charge," Sandalls continued. He explained that if an independent bank were to join both Express 24 and Yankee 24 networks, it would have to pay a charge to Yankee 24 on all transactions, even those switched through another network.

"It's like a tax," Sandalls maintained. "It puts other networks at a disadvantage. The motivation for smaller banks will be for them to use Yankee 24 only."

In a three-year period, the charge for transactions carried out at a Yankee 24 ATM but switched to another network would increase to four cents per transaction, Sandalls said.

"There are hundreds of smaller banks affected by this. They have the desire to stay independent. Big banks have conspired to route all their transactions through the Yankee 24 switch and not others," Sandalls claimed.

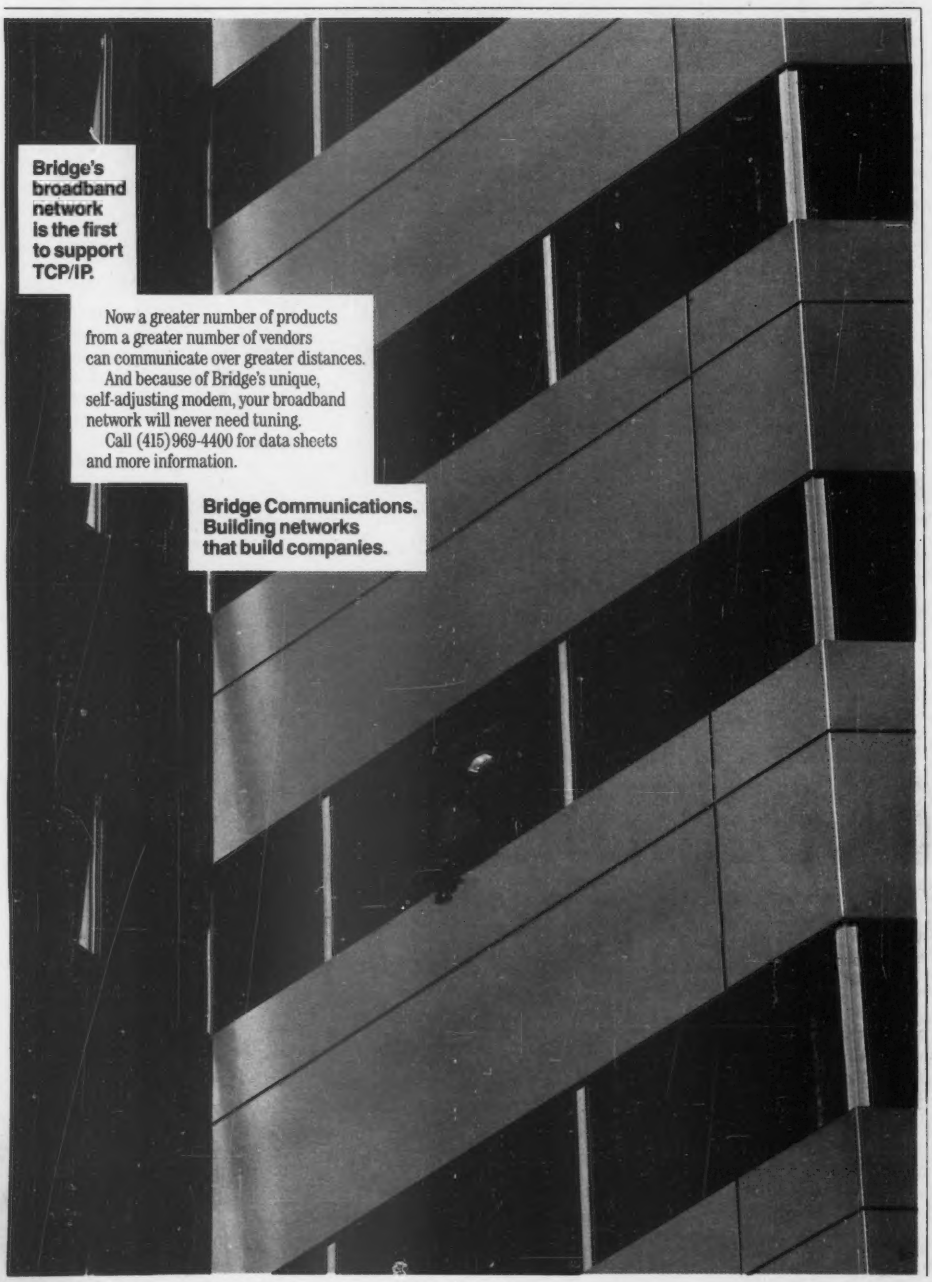
Disinterest

Defending his bank's disinterest in joining Yankee 24, he said, "We provide the finest electronic banking in New England. It's not beneficial for us to open up to customers of any old bank."

Mitchell St. Thomas, president of Connecticut Switch, responded, "We unbundled the switch fee, which is 18 cents. The decision was part operations and part marketing."

He said the overall fee was not changed despite its restructuring and claimed other network operators, whom he declined to name, are similarly altering their switching charges.

"The reason they're so agitated is that they're so dominant," St. Thomas said. However, he added that Yankee 24's initial 1,300-terminal network will exceed Baybanks' current terminal installation and that Yankee 24 expects to rapidly add to that number.



PC package runs remote job entry

From page 19

printed on a local printer.

There are a number of benefits for users who communicate regularly with the mainframe in remote job entry mode, according to beta-test user Charlie Janssen, project manager at Safety-Kleen Corp. in Elgin, Ill. Such a user could receive reports or send data while doing Lotus Development Corp. 1-2-3 or word processing applications. "Someone with those requirements can get a lot more work done," he said.

While Janssen's company has not used the program extensively yet, he said he expects it will become an important benefit as Safety-Kleen's fledgling companywide network grows. The product can also transfer data to a mainframe.

The $785 software includes Network Software Associates' existing PC-to-mainframe communications link, which is called Adaptsna RJE. Host communications are accomplished via emulation of an IBM 3770 remote job entry workstation in an IBM Systems Network Architecture/Synchronous Data Link Control (SDLC) environment, the vendor said.

RJE/Background requires an SDLC adapter board. The product also requires one copy of the software for each PC.

Gate links X.25, SNA on net

From page 19

according to Dave Farkin, Tekeleck director of sales.

The Translator also acts as an IBM Systems Network Architecture (SNA) 3274 Cluster Controller, allowing asynchronous terminals to access IBM hosts either directly or over an X.25 network. Primary and secondary Burroughs Poll Select protocols also are supported by the Translator.

Support of Ethernet 802.3 permits multiple Translators to share the same local-area network so that "you can have 40 or 50 users with terminals and personal computers" accessing various networking environments via the Translators, Farkin said. A Translator can support multiple protocols and up to eight ports.

'Cost-effective'

Available now, Translator has a suggested list price of $6,900 with one protocol option. Software packages supporting additional protocols cost between $150 and $350. "The Translator is not meant to be a plain network terminal server; it's cost-effective for companies that need to support bisynchronous, SNA and X.25 protocols on one premise," Farkin said.

The Chameleon 32 has been enhanced so that it can be used to test both customer-premise and carriers' central office equipment for conformance with the ISDN Basic Rate, particularly the 16K bit/sec. D channel that carries message sets for setting up call circuits, error recovery and alarm messages, according to Anders Hultin, Tekeleck's director of ISDN pulse-code modulation technologies.

The product will initially target manufacturers and carriers that want to test equipment for ISDN conformance.

The Chameleon 32 with Basic Rate interface monitors transmissions along the D channel to ensure conformance to ISDN norms, Hultin said.

D channel messaging specifications are still not firm, so Chameleon 32 only incorporates those protocols already approved by the Consultative Committee on International Telephone & Telegraph and will add features as manufacturers agree on specifications. "Two months from now they could change the whole thing, so our product remains a general tool that can test for individual functions that differ between carriers," Hultin said.

The suggested retail price for the Basic Rate interface for the Chameleon 32 is $3,500. It is available now.

Xenix, VAX tied to PC

From page 19

to-TCP/IP interface standard that is currently being finalized by an industry task force, Bal said.

The SCO-Excelan and Syntax-Excelan joint offering is intended to allow VAX/VMS- and Xenix-based systems to coexist as file servers on the same TCP/IP-based network, according to Bal.

Standards gain fresh recruits

From page 19

ages written for Netbios to run on top of TOP protocols, creating a plug-and-play system that requires no additional code to work, Soriano said. A version of the product designed for IBM PC ATs running Microsoft Xenix includes FTAM and session-layer software. It costs $600.

Industrial Networking introduced the MQ-400, a MAP subsystem for the Digital Equipment Corp. Microvax II.

Industrial Networking's MAP/One Applications Services software product will sell for $2,000 for IBM PC-DOS systems, $4,500 for DEC Microvaxes and $10,000 for DEC minis.

Proteon adds router, says it supports token-ring standard

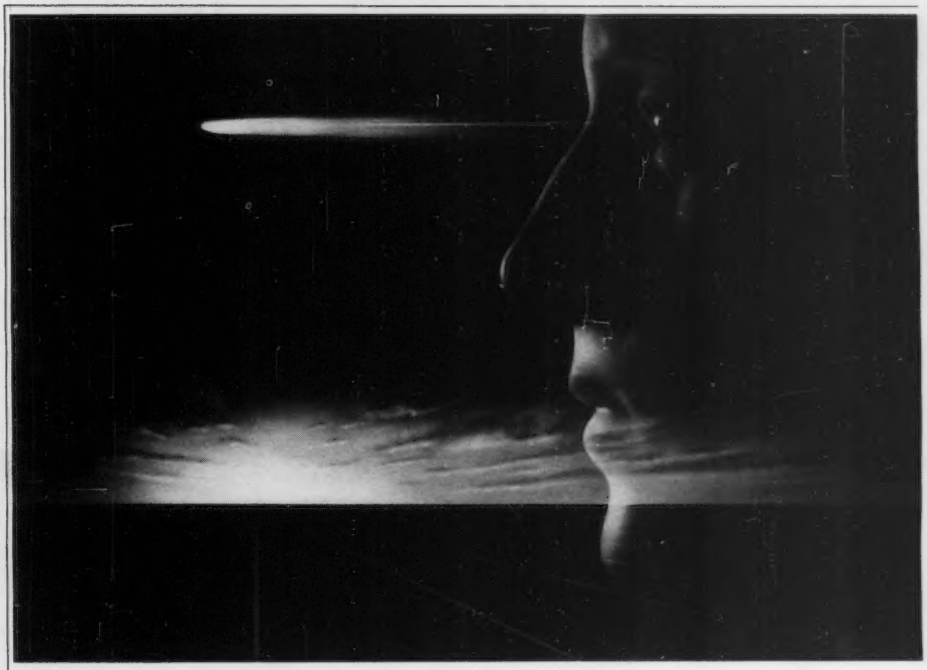
By Elisabeth Horwitt

WESTBORO, Mass. — Proteon, Inc. announced last week that its P4200 Gateway now supports the IEEE 802.5 token-ring standard. The P4200 passes transmissions between local-area networks (LAN), enabling workstations on different LANs to exchange information and share resources, according to Nancy Kratora, Proteon marketing communications manager.

The P4200 is not a gateway but a router that handles internetwork transmissions only for nodes that are using the same upper-level protocol, such as Transmission Control Protocol/Internet Protocol, Krakora explained.

However, the P4200 does pass transmissions between dissimilar networking environments, including Ethernet 802.3, T1 and 56K bit/sec. wide-area networks, Proteon's proprietary Pronet 10 and Pronet 80 token-ring networks and now both the IBM Token-Ring Network and Proteon's 802.5-compatible Pronet-4.

The P4210 Pronet-4/IEEE 802.5 interface for the P4200 Gateway costs $3,590, software included. It is expected to be available this month.



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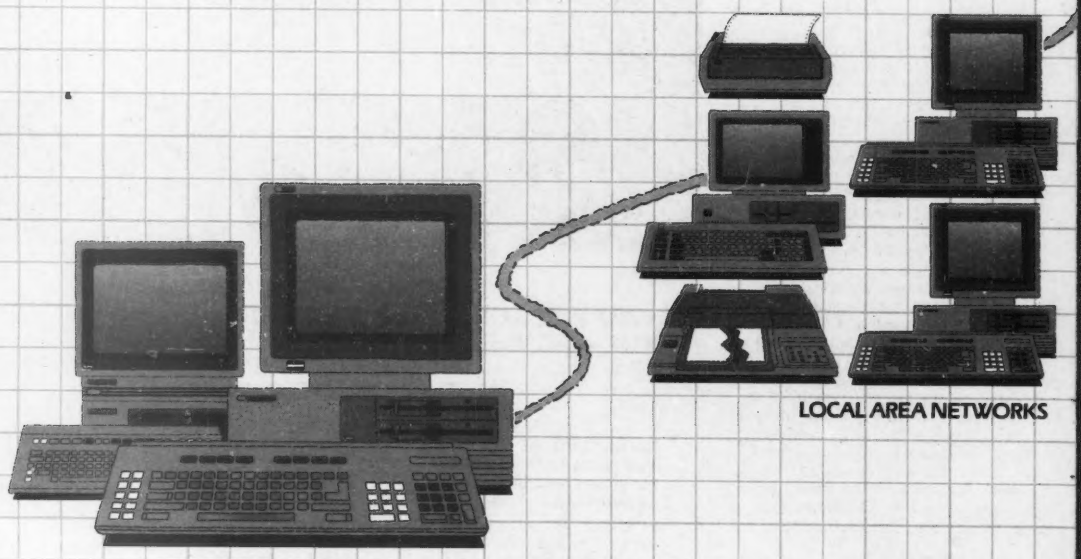

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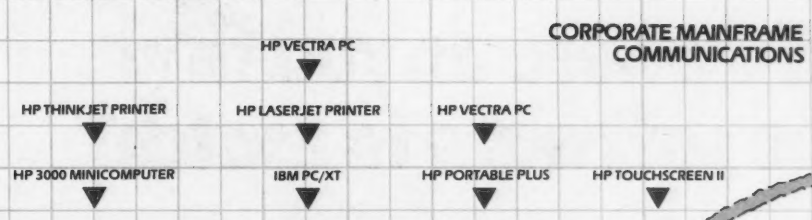

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SOFTALK
Anthony Reed

Cutting the apron strings

The managers had just completed ranking their programmers for the performance reviews when someone suggested that the staff review and rank their managers.

There was nervous laughter in the room, but the idea of having programmers and analysts rate their managers was an interesting concept. After the meeting, I began an informal, behind-the-scenes review of how the staff would conduct the reviews and what criteria they would use.

The one type of manager that always received the lowest ranking was the "apron strings" manager. This type of manager started out as a programmer but never learned to let go of his programming responsibilities — his mother's apron strings.

We all know him — the manager who is three levels removed from the highest programming position but who insists on writing a program or attending a programming class just to let the troops know that he can still perform at his old level; who insists on redesigning the entire system just to let the troops know that he hasn't lost his flare for systems design.

The apron strings manager has the very good intentions of creating a good product; however, in the process, he is destroying the morale of his staff. The staff frequently feels that it is not growing because its members are not allowed to learn by doing. They also feel that they cannot criticize the quality of the design, even though they may have strong objections, because the apron strings manager's pride and ego are stamped on the design and the workers' performance reviews.

This manager also suffers from memory lapses when setting project dead-

See **CUTTING** page 31

Reed is a senior systems analyst with the Federal Reserve Bank of Dallas, Texas.

Cobol restructuring debated

Experts say styles are unlike due to lack of standards

By Charles Babcock

CHICAGO — Three authors of software that restructures Cobol programs met here last week to advocate the use of restructuring techniques. They acknowledged, however, that the differences among their products reflect a lack of a standard restructuring approach.

Meeting head to head for the first time last Monday were J. Cris Miller, principal of Peat, Marwick, Mitchell & Co.'s Catalyst Group in Chicago and author of Structured Retrofit, the Big Eight accounting firm's restructuring product; Eric Bush, chairman of Language Technology, Inc. in Salem, Mass., and author of Recoder; and Henry W. Morgan, vice-president of Group Operations, Inc. in Washington, D.C., and author of Superstructure. The three were invited to a three-hour debate on the merits of their products before members of the Software Maintenance Association.

IBM, which also offers a restructuring product called Cobol Structure Facility, or Cobol/SF, declined to send a representative to the debate. Cobol/SF is used in conjunction with IBM's VS Cobol II, but the new version of IBM Cobol has not yet been widely implemented, the debaters noted.

Each of the restructuring tools reorganizes a Cobol application to eliminate backward jumps in the logic path, recursive or wandering logic or GOTO loops within a paragraph. After restructuring, the logic path either moves forward through the program or moves out laterally like a branch off a tree trunk, "making it easier for maintenance programmers to understand," noted Garish Parikh, software maintenance consultant, author and a moderator of the event.

A program whose logic is so convoluted that it jumps both forward and backward, sometimes from the center of paragraphs, will remain a poor program even after restructuring, but the comprehensibility of many programs can be improved through restructuring, Parikh noted.

With different products and no single recommended way to restructure, the maintenance programming manager faces a quandry. "It boils down to a Pepsi taste

See **COBOL** page 30

Pansophic offers Telon on PC

By Charles Babcock

Pansophic Systems, Inc. is offering its Telon mainframe application development environment on the personal computer at a price of $9,500 for two copies.

The PC system is memory-hungry; it requires a 640K-byte random-access memory, 5M to 7M bytes of hard-disk space and one double-density 360K-byte floppy disk drive or a high-density 1.2M-byte floppy disk drive.

The design tool is aimed at current and potential Telon mainframe users who are seeking to off-load some of their mainframe development costs, company spokesmen said. Off-loading development to the micro also speeds response time to the development programmer, the spokesmen added.

Telon is among the largest applications development generators available. It competes with systems including Sage Systems, Inc.'s APS; CGI Systems, Inc.'s Pacbase; Higher Order Software, Inc.'s Use-It; and Tarkenton Software, Inc.'s Gamma, now part of Knowledgeware Systems, Inc.

The development systems are able to capture design specifications including screen layouts, report formats and program descriptions and generate a working application from them. The systems typically retail for $150,000 and up.

The personal computer version incorporates all mainframe Telon functions, capturing design information and generating a Cobol or PL/1 source program that can run on the mainframe. The PC version also provides integrated testing of the generated application in IBM's IMS and CICS or batch environments, Pansophic spokesmen said.

Telon PC utilizes the PC architecture by using a short Help message at the bottom of each screen. Developers may choose from 16 screen colors or select improved field intensity.

A built-in DOS command processor allows the developer to exit DOS and execute other IBM PC-DOS commands or run a PC application. It operates on the IBM Personal Computer XT, AT, AT 3270 Model 6, XT 3270 Model 6 or any compatible model running PC-DOS 2.1 or above, according to company spokesmen.

INSIDE

Tool keeps DB2 users informed about DBMS operation/**28**

Goal Systems introduces development system for CICS applications/**28**

NEW THIS WEEK

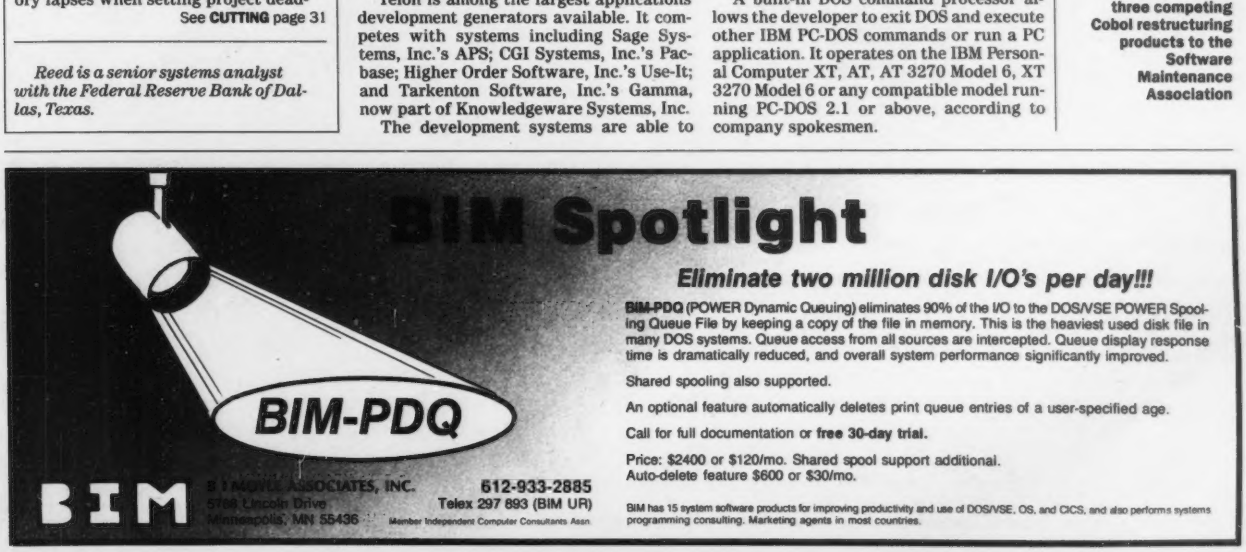
- Oracle ports SQLCalc to VAX/VMS
- Cincom Systems releases Version 1.4 of its Mantext mainframe text processing system

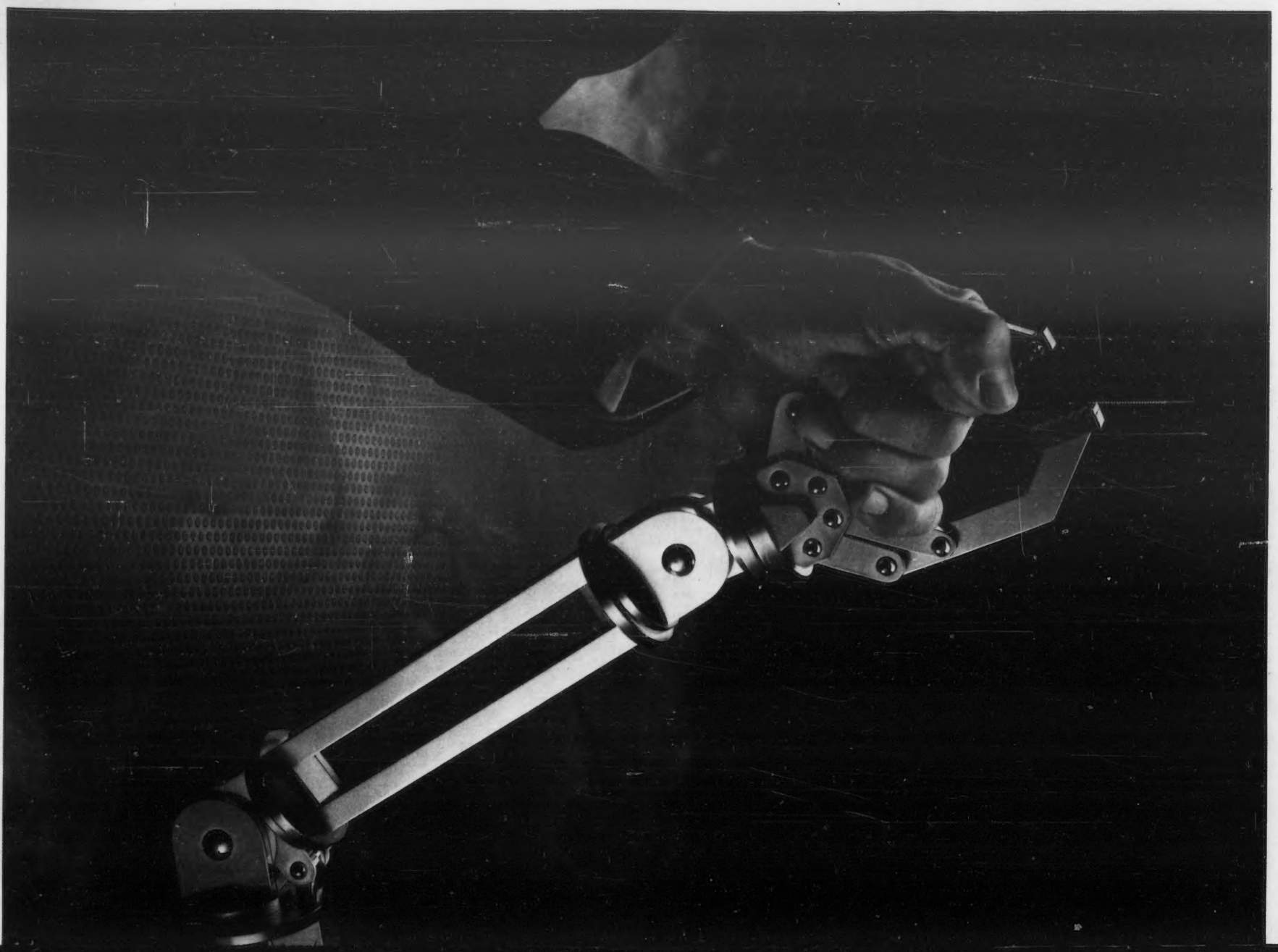
For more on these and other new products, see pp. 59-68.

INSTANT ANALYSIS

"We have three products. There is no standard definition of structure. . . . What we really have is a situation where you have to mix and match. It boils down to a Pepsi taste test."

— Henry W. Morgan, vice-president of Group Operations, Inc., commenting on three competing Cobol restructuring products to the Software Maintenance Association





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Tool explains DB2 operation

By Charles Babcock

HOUSTON — A source of information on the operation of IBM's DB2, called Let's See DB2, is available in the form of a tool from CDB Software, Inc.

The data base administration tool runs as an application under IBM's ISPF Dialog Manager and Time Sharing Option teleprocessing monitor. During normal operation, the tool requires no I/O, making for quick response time, according to Michael Burman, a principal of CDB Software.

Let's See DB2 attempts to address three areas of DB2: management of proliferating DB2 objects, management of direct-access storage devices (DASD) and management of utilities, he said.

In addition, reducing contention for the DB2 catalog can improve the data base management system's performance. The CDB Software product removes user queries to the catalog seeking to determine the state of the system, Burman claimed.

The catalog contains tables defining views of DB2 objects — table spaces, tables, indexes and index spaces — that are the logical resources of the DBMS. The views are defined in order to provide users with access to data about objects within their authority while restricting them from other objects. The authorization system of Let's See DB2 eliminates both the need to define such views and the catalog contention associated with them, Burman said.

Let's See DB2 identifies DB2 objects and the relationships among them and allows the user to view pages from table spaces and index spaces on DASDs, he added.

It also provides graphs, maps and numerical summaries of DB2 table spaces and index spaces. These "snapshots" display the amount of free space for table spaces, update status for table spaces and usage for index spaces at a particular time, Burman said.

In addition, the product allows a user to display DB2 table spaces, Burman said.

The product uses 40 menus and information screens backed by 100 Help screens.

Let's See DB2 is available immediately, with an initial license charge of $4,800 and an annual fee of $4,800. It is being offered with a 30-day free trial, Burman said.

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Goal introduces on-line system for CICS applications

COLUMBUS, Ohio — Goal Systems International, Inc. has announced the release of Quiktask, an on-line, interactive application development system for IBM CICS applications.

The system uses a Cobol-like procedural language employing commonly used verbs, which allows batch programmers to work in it using their Cobol language skills, Goal spokesman Jim Crossley said.

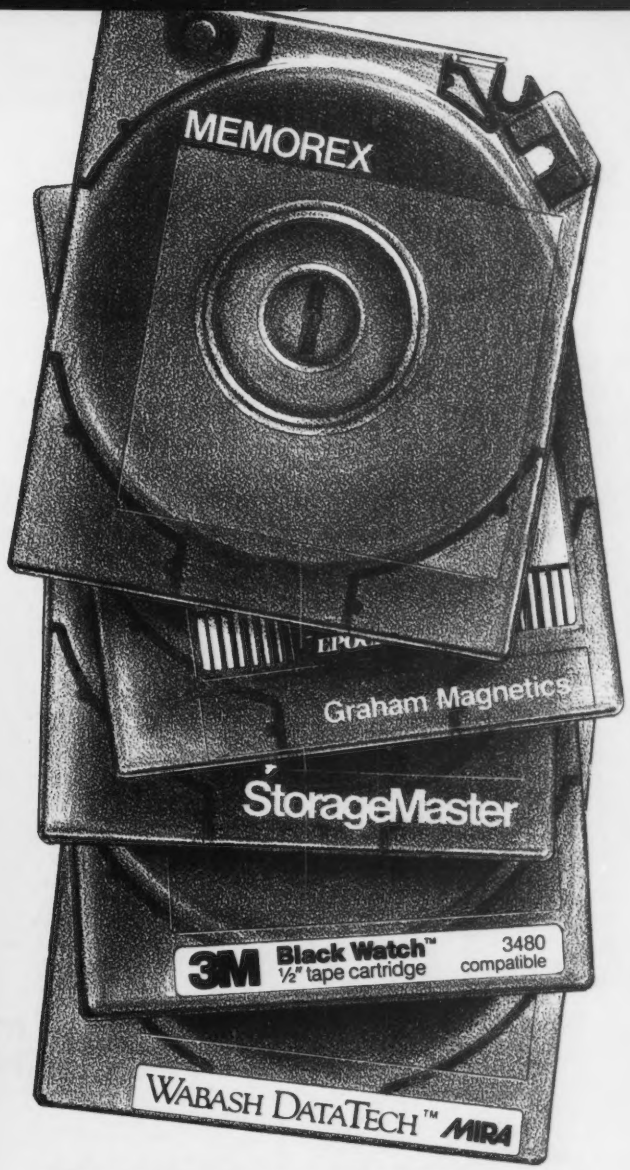
The system includes 10 integrated subsystems: on-line Help, on-line training, dictionary, screen painter, language, editor, translation, test and debug, execution and utilities.

Quiktask can interface to existing Cobol-callable routines, subroutines and copybooks, company spokesmen said.

Quiktask is designed to run on IBM mainframes under CICS 1.5 or above with IBM's DOS/VSE or MVS.

It costs $44,800 for MVS and $35,000 for DOS/VSE.

The execution subsystem is available as a separate option for DP centers that do not need the full development system. It costs $22,400 under MVS and $17,500 under DOS/VSE.



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Cobol restructure debated by pros

From page 25

test," Group Operations' Morgan said, urging users to try all three restructuring products.

Language Technology's Bush maintained that Recoder, unlike its competitors, uses an approach to restructuring that can be measured by McCabe Metrics. By pursuing a complexity measure of one by the McCabe standard, the results of Recoder are both predictable and measurable across applications, he said.

Peat, Marwick's Miller attacked the McCabe measures, asserting that they "have never been empirically established."

Bush responded that the McCabe standard has been written about frequently and is an accepted measure of program complexity.

Miller and Morgan said that Bush's product sometimes creates new paragraphs in the process of restructuring, including replicated code. "We have an ironclad rule with our product: No fragmentation, no replication," Morgan said.

Much of the debate revolved around how each product simplified GO TO loops and PERFORM statements.

Richard G. Harrison, director of the Federal Software Management Support Center, part of the General Services Administration (GSA) in Falls Church, Va., said the Group Operations and Peat, Marwick products tend to "adjust the semantics of the program," creating a simpler loop.

For example, he said, instead of allowing a GOTO to transfer program control outside a particular procedure, Superstructure tends to restructure the program so the transfer goes back to the initialization or mainline of the procedure and starts over. By resorting to such a simple device, Superstructure simplifies the maintenance programmer's task, Harrison said.

'Eliminates GOTOs'

The Language Technology product, on the other hand, analyzes a program, "eliminates GOTOs and PERFORMS and automatically replaces them with new code," Harrison said. Harrison had compared all three products for the GSA, which selected Peat, Marwick's Retrofit.

All three vendors claimed that their products yield restructured programs that are the functional equivalent of the original.

Group Operations' Morgan claimed his product yields a program that most resembles the original, making it easier for experienced programmers to navigate through it.

Those programs most heavily involved in maintenance efforts should be the first candidates for restructuring, Morgan said, in response to a question on what gets targeted for restructuring.

Parikh asked the panel the size of the largest program each had restructured.

Miller said the largest program restructured with Retrofit was 45,000 lines. Morgan said Superstructure could restructure a program up to 30,000 lines long. Bush said Recoder's limit was 32,000 lines, a limitation imposed by IBM Cobol 68/74 compilers. He added that he expects the constraint to be lifted with VS Cobol II compilers.

The restructuring products have been available through commercial services, such as the former Catalyst Corp. — which was acquired by Peat, Marwick and became the Catalyst Group — and Language Technology, since the early 1980s. They have been available as independent software products for two years or less. Retrofit is priced from $59,000 to $89,000; Superstructure is priced from $28,000 to $45,000; Recoder is priced from $40,000 for a short-term lease to $150,000.

A total of 35 copies of Recoder have been sold, Bush said. Fifty copies of Retrofit have been sold, according to Miller. Morgan said about 115 copies of Superstructure have been sold.

SOFTWARE NOTES

Cortex, DEC weave units

Cortex Corp. in Waltham, Mass., will interface its **Application Factory 4.0** and Corvision diagramming front end to **Digital Equipment Corp.'s** relational data base management system, **Rdb**. The development system produces applications for the VAX, and the Rdb interface can be used in conjunction with the existing record management system file-management interface, the firm said.

■

The **Cambridge Systems Group** of Santa Clara, Calif., now part of **Uccel Corp.**, has announced a 10% price increase on its popular IBM MVS security package, **ACF2**. Effective Feb. 16, the price of a single CPU license will be increased from $33,000 to $36,300, spokesmen said.

■

Symbolics, Inc. has introduced a **CommonLISP Cross-Compiler** that allows users to port expert systems developed on Symbolics 3600-family machines to general-purpose workstations. The compiler was written by **Lucid, Inc.** Currently supported workstations are **Motorola**, Inc. MC68000-based units from Sun Microsystems, Inc. and Apollo Computer, Inc.

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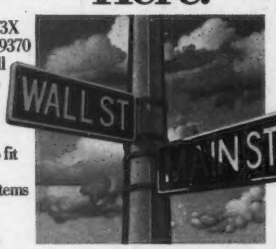

Mainframe Territory

If you've already invested in IBM mainframe technology, the new 9370 Information System is a great way to enhance that investment.

The 9370s put IBM's powerful 370 mainframe architecture into a small, affordable package. Because they share a common architecture and offer a choice of four operating systems, 9370s allow you to choose from virtually all of the thousands of application programs available for IBM mainframes. Yet because they don't have to live in computer rooms, 9370s can run these programs from wherever you need them to be.

Here.

Because of the familiar architecture, personnel trained in IBM mainframe use will be at home with 9370s. With new prepackaged software, novices will soon feel at home as well. And 9370s will likewise be at home in many roles: as host systems, departmental systems or remote extensions of existing mainframes.

As your needs grow, 9370s can grow with them—with larger processors and more storage that's affordable and easy to install. Giving you a five-fold power range in the 9370 line—and a hundred-fold span of computing power within the 370 family from the entry-level 9370 to IBM's biggest mainframe.

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Where you need a standalone combination of power and simplicity—in departments, in dealerships, in distributorships or in small businesses—the IBM System/3X family fits right in.

System/36 is IBM's simplest and least expensive entry point into mid-range computing. In addition to being IBM's most user-friendly mid-range system, System/36 also offers a broad spectrum of application software from specific industry solutions to office applications that suit any business.

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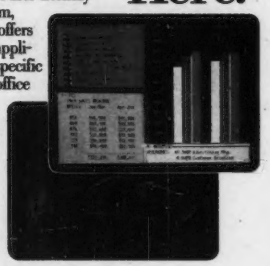


For growth, the System/38 provides a built-in relational data base (allowing you access to data on your own terms) as well as a toolbox of programming aids to help you, in a remarkably short time, custom-design applications that fit the job at hand.

The System/3X family members function equally well

System/3X

Cutting the apron strings

From page 25

lines. Since he's been away from real programming for a number of years, he tends to suffer from the "we did it in two days" syndrome.

You know the situation. Your project plan states that it will take you 18 months to complete the new online accounting system using structured programming and to write the documentation before you write the code.

But your manager recalls it took them mere days to design, write and install the old accounting system back in the 1800s. If he could do it in two days, so can you. Why, he'll even volunteer to write the design and code one of the 287 programs for you.

Characteristics

We began to recall previous apron strings managers (they were the reasons we were no longer with our former companies) and to identify their characteristics. We found that:

- Their secret desire was to get out of management and back into programming, but with the same money.
- They were the technical gurus of their day and were rewarded with promotions.
- They usually couldn't write very well, so they delegated that task to subordinates.
- They usually didn't have enough work to keep them busy, so they hopped at the chance to design a system that required their approval.
- They always felt that they knew what the user wanted.
- They had inflated egos, yet they always wondered why you didn't tell them you needed more time to work on the project after they set the project deadline.
- They'd worked in data processing for 193 years and could remember the first computer the company ever purchased.
- They remembered when the northeast corner of the dining room was the DP department.
- They wondered why your marriage was on the rocks when you had worked 80 hours a week for the past year.
- They would rewrite one of your programs or make the same maintenance change just to see if you both did it the same way.

After we finished naming the traits, we tried to develop a plan of action to help the manager cut the strings. After all, we could not continue to change jobs eight times in six years without running out of employers. These are the steps that we decided to take:

1. Before you define the user requirements, ask the manager if he has something that should be built into the design to keep him satisfied. This gives him the feeling that he's a project leader, but you are really the person in control.

2. Give him weekly status reports. This keeps him from coming to your office, snooping around on your desk and finding a problem that he can "help" you resolve.

3. Offer to let him work on a noncritical part of the project. If you assign a task to him, he will feel honored that you think he can still do the job.

4. Ask him for advice — even if you don't need it — on a noncritical problem.

5. Try to keep him too busy to interfere with the individual members on your staff. If they mistakenly mention a problem they are having, he may be more than willing to help.

6. Identify all of your project tasks, prepare a critical-path chart and indicate the length of time required to complete each task. If he says the project deadline is too long, ask him to select which tasks you should skip. Hopefully, he will realize that cutting corners can cut his own throat.

7. Never tell him he is getting in your way — unless you have your resume updated.

8. As a last resort, talk to his manager (especially if he's not an apron strings manager) and let him know how you feel. They may be able to keep your manager too busy to get in your way.

We realized that apron strings managers will not lose their desire to be programmers; however, hopefully, if they stay busy with their own work, they won't do yours.

the mid-range in where you need most:

as the largest computers in a business or as departmental computers in large companies. And to provide you with the communications and growth options your business needs, the System/3X family was recently enhanced to provide even smoother peer-to-peer communications, greater host and PC connectivity, and stronger networking with IBM 370 mainframes and PCs.

And if you need more power, you can expand the System/36 and System/38 independently, or you can link them in a network where they can share information and resources.

Here.

The System of Choice

One choice you won't have to make with IBM is where to find advanced technology, abundant connectivity options and numerous business solutions.

Because they're in all our mid-range computers, across the board.

Both the 9370 and System/3X families use IBM's one-million-bit memory chips and denser logic to achieve their high power and speed. And two new direct-access storage devices give the 9370 and System/3X increased capacity with unusual economy.

All this technology is fascinating in its own right. But it just gives you more in terms of real mid-range computing options: growth upward to mainframes, highways between mainframes and PCs or other workstations—or flexible connections with networks and enhancements either from IBM or other manufacturers.

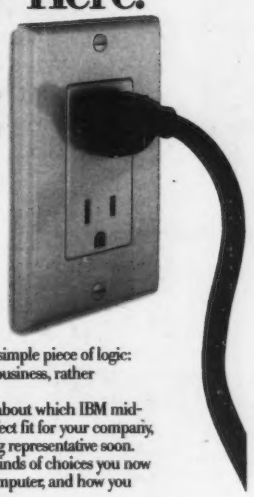
And integrated office solutions to meet your needs are available on both systems.

Here.

Where You Work

Perhaps the best fit of all is the way IBM's mid-range computers fit into your working environment. The 9370s are very neighborly. With set-up times of under five hours and rack-mounted components that can be installed like stereo equipment. System/3X family members are simple to operate and fit in easily, too.

All are extremely quiet, need no special air conditioning and operate on standard 110 or 220 VAC wall current.



A Fitting Conclusion

The reason IBM mid-range systems fit in so well is based on a simple piece of logic: they're built to fit your business, rather than vice versa.

To find out more about which IBM mid-range system is the perfect fit for your company, call your IBM marketing representative soon. You'll learn about the kinds of choices you now have in a mid-range computer, and how you can start making them.

As it's only fitting you should.

IBM

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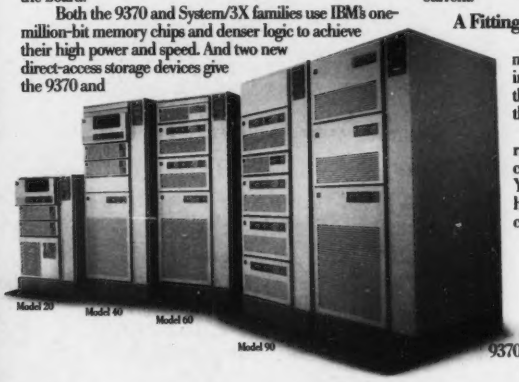

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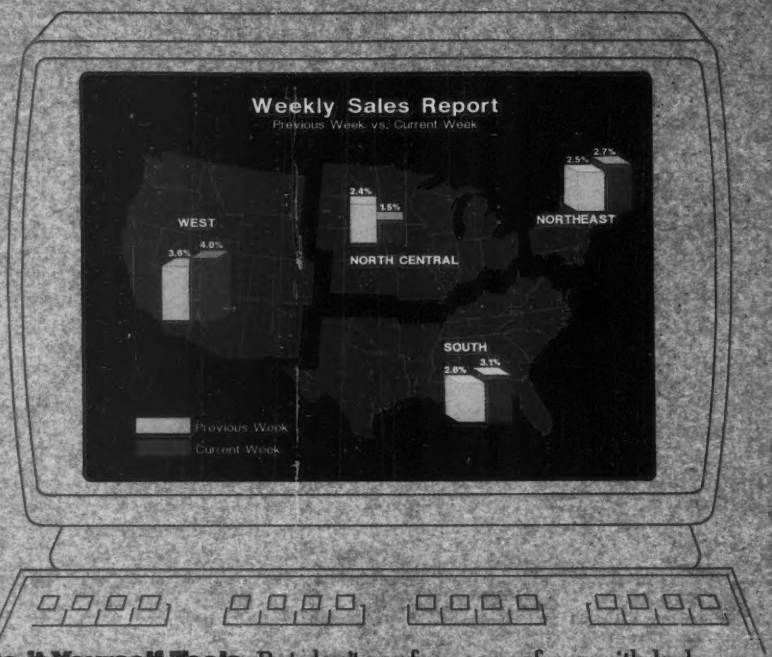

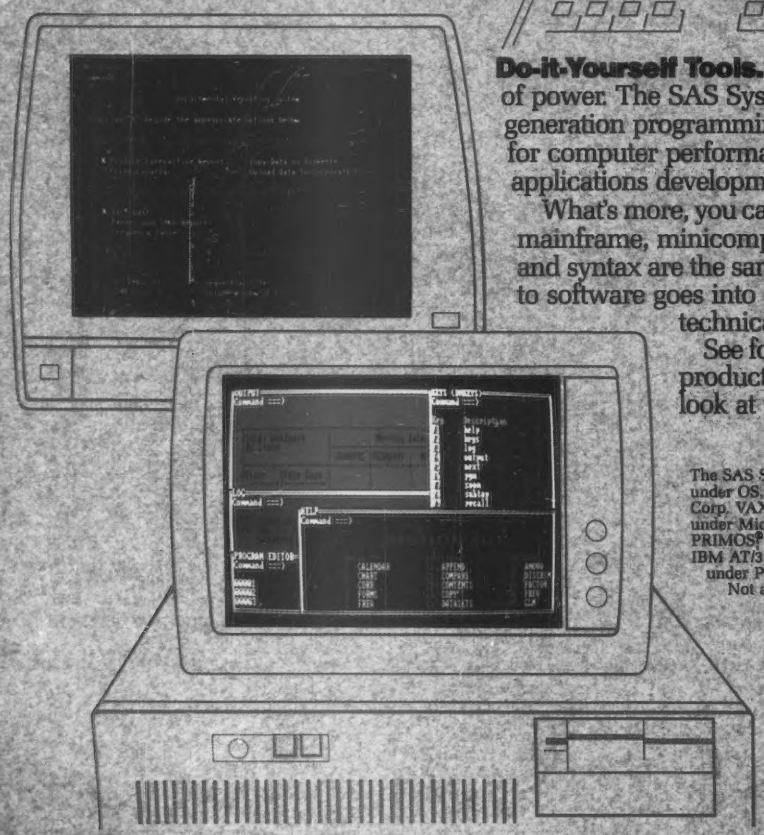

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MICROCOMPUTING

MICRO BITS
William Zachmann

Toshiba laptop means business

Early projections of the market for laptop computer sales were excessively optimistic. Except for the Tandy Corp. Model 100, an inexpensive unit with built-in software but without built-in disk drives, none of the first wave of systems were very successful. And more capable systems offering IBM Personal Computer compatibility were just too expensive to gain broad acceptance.

But during the past year, Toshiba Corp.'s 1100+ has done a lot to bring affordable IBM PC compatibility to the laps of corporate users. At $2,399 with 640K bytes of memory and two 3½-in. 720K-byte diskette drives, the 1100+ is an attractively priced product.

Parallel, serial, red-green-blue monitor and composite video ports are built in as standard features. These are often separately priced features on laptops from other vendors. The effect is to make the Toshiba 1100+'s pricing highly competitive. This is undoubtedly a major reason why, according to Framingham, Mass.-based market research firm International Data Corp.'s preliminary estimates, the 1100+ was the best selling IBM PC-compatible laptop in 1986 despite being sold for only the last six months of the year.

In fact, even more 1100+ systems would have been sold in 1986 had Toshiba been able to supply enough to meet the demand. Despite supply limitations, however, Toshiba appears to have sold more 1100+ systems in the last six months of 1986 than IBM sold

See **LAPTOP** page 34

Zachmann is vice-president of research at International Data Corp.

Software Link gains support

Language developers to supplement 80386 PCs

By David Bright

ATLANTA — The Software Link, Inc. last week announced that two language developers will support its PC-MOS/386 multitasking, multiuser operating system for Intel Corp. 80386-based personal computers.

Software Link describes PC-MOS/386 as a superset of Microsoft Corp.'s MS-DOS operating system that achieves compatibility with existing MS-DOS programs and also supports the 80386 chip's 32-bit native mode.

A Software Link spokeswoman reported that the availability of the development tools would give developers incentive for creating applications that have the ability to take advantage of the 80386's 32-bit native mode.

The two developers are Phar Lap Software, Inc., based in Cambridge, Mass., and Metaware, Inc. in Santa Cruz, Calif. Phar Lap offers the 386/ASM assembler and 386/Link linkage editor for $495 together, while Metaware provides High C and Professional Pascal compilers priced at $895 each.

Officials at the two companies could not say for sure how long it would take for 32-bit native mode applications to become available.

Bob Moote, vice-president of software at Phar Lap, predicted some applications could appear in six months.

Memory and other features

While maintaining MS-DOS compatibility, PC-MOS/386 is said to support huge amounts of random-access memory, including the 80386's limit of 4G bytes, and features such as record and file locking, print spooling and remote modem access. "The 640K-byte barrier is gone," Metaware Vice-President Tom Pennello said.

A version of Basic is also available for PC-MOS/386. Last November, Software Link agreed to bundle Summit Software Technology, Inc.'s Betterbasic/386 with the operating system.

Software Link said it plans to have the full version of PC-MOS/386 available next month. The company also offers a programmers' guide for 32-bit application software under PC-MOS/386.

Desktop tools headline expo

By Peggy Watt

SAN FRANCISCO — Product announcements at the recent Macworld Conference and Exposition focused on desktop publishing, with desktop accessories and storage products rounding out the offerings.

Graphic-design supply veteran Letraset USA will finally enter the desktop publishing market and sell Ready, Set, Go, a page layout program established by Manhattan Graphics in Valhalla, N.Y.

Borland International, Inc.'s Sidekick 2.0 desktop accessories package included updated features of Outlook, an outline processor; Macplan, a limited spread-

See **DESKTOP** page 35

Macworld attendees want connectivity, graphics options

By Peggy Watt

SAN FRANCISCO — Apple Computer, Inc.'s priorities of publishing, general graphics applications and connections to other systems were on the minds of many attendees at the Macworld Conference and Exhibition here this month.

"We want to use the Macintosh to open windows to the map libraries stored remotely on minicomputers," said Barnaby F. Guthrie, computer systems specialist for Coast Forest Management Ltd., a Victoria, B.C., logging and engineering firm.

See **MACWORLD** page 35

INSIDE

North Edge releases time and billing software package for IBM-compatible microcomputers/**34**

NEW THIS WEEK

- Micromain Software offers a CICS screen painting and design facility for personal computers

For more on this and other new products, see pp. 59-68.

INSTANT ANALYSIS

"The next real Dbase IV, according to Dbase aficionados, is going to come from Wayne Ratliff, the man who wrote Dbase II and did the direction for Dbase III."

— Dbase aficionado who asked not to be identified

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Laptop means business

From page 33

of its laptop, the IBM PC Convertible, all year long.

Using the 1100+, however, makes it clear that more than just aggressive pricing has contributed to its success. It is a well-built, solid system with the quality construction and performance you would expect of a first-class product from a first-rate vendor.

The 640- by 200-pixel LCD built into the unit is large enough, at 9.1 by 4.7 in., to be comfortably readable. Its adjustable angle and variable contrast-control go a long way toward overcoming the inherent limitations of an LCD display. With the ability to display a full 25 lines of 80 characters each, as well as IBM PC monochrome graphics, it offers compatibility with standard software.

The 81-key keyboard is full-size. It has nicely sculpted keys, yet is remarkably compact. It includes large typewriter-size Shift, Enter (Return) and Backspace keys. There is no separate numeric keypad, but one is available on the right side of the alphabetic keyboard via the Number Lock key. Cursor keys are located in an inverted "T" at the bottom right corner of the keyboard. Ten function keys are lined up across the top of the keyboard.

Light, compact

Despite the full-function display and keyboard, the whole unit is built into a very light and compact package. Weighing an ounce less than 10 pounds, the 1100+ is one of the lightest laptops available. It is 12.1 by 12 in. around and just more than 2.6 in. high.

The 80C86 microprocessor driving the 1100+ is a complementary metal oxide semiconductor device, which gives it very low power consumption. This, combined with an efficient design for powering the display and disk drives, gives an operating time of more than seven hours from the built-in rechargeable battery.

In addition, the 80C86 in the 1100+ operates at two speeds. The standard 7.16-MHz mode gives performance about 50% faster than the standard IBM PC or Personal Computer XT. By means of a keyboard soft switch (pressing the Control, Alternate and Page Down keys simultaneously), it can also be made to run at 4.77 MHz to ensure compatibility for timing-sensitive software.

A handy and attractive black carrying case is included with the system at the basic price, along with a battery charger/AC adapter and Microsoft Corp. MS-DOS 2.11. A copy of Borland International's popular Sidekick desktop organizer program is included on 3½-in. disks with the system.

Options

Optional features include an internal 300/1,200 bit/sec. modem, an expansion chassis and interface providing five IBM PC-compatible slots, an external 5¼-in. disk drive, an automobile power adapter and a floppy link. The last is a card that fits into an IBM or compatible PC expansion slot and makes it possible to use a 5¼-in. drive on the desktop system as an extension of the 1100+.

The Toshiba 1100+ delivers the full function of an IBM PC-compatible system in a remarkably small and light laptop package. Like many others, I've hesitated to settle for the compromises most laptops have required, but the 1100+ has what it takes to make me a confirmed laptop user.

SCIENCE/SCOPE®

A proposed satellite system for mobile and remote communications would use different frequencies for different needs. The mobile satellite network would relay two-way voice and data communications services from airplanes, cars, trains, or remote locations. The system would use two Hughes Aircraft Company HS 393 spacecraft, one operated by the United States and another by Canada. UHF, a low frequency band that can be picked up by small antennas, would be reserved for trucks and cars. A higher frequency that requires larger antennas, L band, would be dedicated to remote telephone service. A third frequency, Ku band, would provide a gateway to local telephone systems, preserving scarce capacity on L band and UHF frequencies. Hughes Communications Mobile Satellite Services, Inc. is seeking authorization from the Federal Communications Commission to operate the system.

Military commanders at separate headquarters can share up-to-the-minute information, thanks to a new automated message processing system for Command and Control Information Systems (CCIS). The system, developed by Hughes, handles a wide range of formatted and unformatted messages as specified in the joint US/NATO military reporting system. It will dramatically lessen the time needed to update planning, intelligence, and force status information in command and control systems. The system can receive messages over a variety of digital links. Messages can be drawn automatically from complex relational databases, or be used to update information automatically. Information can be displayed on screens in a variety of formats, and be modified by commanders.

Helping to trim energy consumption is one major use of a hand-held infrared viewer. The device is a Hughes Probeye® viewer, which senses heat and displays images through an eyepiece. Mining officials use the device to inspect electrical systems and mechanical equipment because it detects potentially dangerous short circuits and overheating hardware. Real estate owners, developers, and appraisers use the viewer to determine the structural and thermal integrity of buildings. The unit reveals moisture spots in roofing and spots where buildings might be gaining or losing heat.

In pioneering work with applications for space-based defense systems and the next generation of missile seekers, Hughes has demonstrated an advanced infrared sensor. The device is believed to be the world's first high-density, staring, long-wavelength infrared focal plane array (FPA). The hybrid chip, smaller than a fingernail, is integrated with optics and electronics to create TV-like images of a scene, even in total darkness. Unlike conventional infrared sensors, which mechanically scan a scene by means of oscillating or rotating mirrors, the FPA stares at a scene in its view at one time. It promises significant performance, size, weight, and cost benefits over ordinary sensors. The device was developed for the Defense Advanced Research Projects Agency as part of Strategic Defense Initiative efforts.

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Billing tool out for small firms

ESSEX, Mass. — North Edge Software Corp. recently unveiled Timeslips III, a $199 random-access memory-resident time and billing system for IBM-compatible microcomputers.

Timeslips III is aimed at medium-size firms, such as law, consulting and accounting firms, that charge for time. The software handles time and billing for firms with three to 25 employees and provides for 3,400 clients and 250 activities.

The package also includes improved speed, transaction reports, summary billing, work sheet and contingency and flat fee billing.

Macworld goers want connectivity

From page 33

Guthrie said he had not been very successful in finding sophisticated language tools for development but called the show the best one-stop shopping opportunity he has found.

Graphic artists Gwen Revino and Kathy Gallion, of California Eastern Labs in Santa Clara, Calif., wanted the latest graphics tools. They said their firm, a sales agency for NEC Corp. Microwave Semiconductor, currently designs only part of its catalog on its computer but plans to convert entirely to electronic publishing. "I like Pagemaker," Gallion added, referring to Aldus Corp.'s desktop publishing package.

Revino said, "Macdraw pales as an illustration tool compared to recent releases, particularly the Adobe [Systems, Inc.] Illustrator."

A computer store sales representative said he shopped not only for wares to sell but also ideas for in-house use. Joseph H. Kress, with Pactel Info Systems in San Francisco, said more than 100 Macs at Pactel stores on the West Coast run spreadsheets, word processing and graphics programs for the business.

"We try lots of things, because we want to stay on top of what people are buying," he explained.

Apple did not announce any new products at the show, but company President John Sculley hinted of communications capabilities that build "industrial strength" onto Appletalk to satisfy a growing cadre of corporate users. Sculley declined to be more specific but repeated that the Macintosh would have to communicate with other systems to make it in the business world.

Apple did not deliver on an earlier promise that the Macintosh would eventually accommodate other operating systems, including Microsoft Corp.'s MS-DOS and Unix. Sculley said only that Apple would "coexist with the vast majority of MS-DOS machines" with hooks into those other systems. One year ago, Apple executives stated that these hooks would be unveiled within a year.

Sculley praised desktop publishing, a dominant application at the show, for enabling Apple "to crack corporate America. . . . We have firmly gotten our feet into many major corporations thanks to desktop publishing," Sculley said. He added that Macintoshes in art departments are prompting installations in other corporate departments.

Microsoft Corp. Chairman Bill Gates illustrated the influence of the Macintosh on the entire microcomputer industry by recalling how the system's ability to display multiple fonts as they would finally be printed was once considered novel. Now this capability is becoming commonplace on IBM Personal Computers and compatibles.

"The nature of the show has changed," said Paul Brainerd, president of Aldus Corp., which showed its unreleased upgrade of Pagemaker design program. "Professionals are looking at the Mac for business. We saw that at the Boston Macworld show, too. On Saturday, the ties and suits were off, but they were still business-oriented users."

Desktop tools headline expo

From page 33

sheet; and communications protocols to the pop-up desk accessory package.

Among the other Macworld announcements:

- Mass-storage products including a fault-tolerant option for the Data Frame XP hard disk, Data Stream tape back-up and combined hard disk with tape from Supermac Technology in Mountain View, Calif.
- Quark Xpress, a $695 desktop publishing system that comes equipped with spell check and a word processor, from Quark, based in Denver.
- Page One, a page-layout program designed specifically for book publishing with a selection of 50 templates, a joint development project from FTL Systems, Inc. and McCutcheon Graphics, Inc., both in Toronto.
- Full Write Professional, a $295 word processing program from Ann Arbor Softworks in Newbury Park, Calif., that includes desktop publishing formatting features such as columns, kerning and the ability to move documents on a page.
- Mind Write, a word processor with multiple windows, graphics import capabilities and Search and Move functions that do not require the clipboard, from Mindwork Software in Carmel, Calif.
- MSC/pal, an engineering-analysis package from MacNeal-Schwendler Corp. in Los Angeles, which performs static and dynamic finite element analysis within the Macintosh interface.
- Hyperdrive FX40, a 40M-byte external hard disk drive from General Computer in Cambridge, Mass., which connects through the Small Computer Systems Interface port.
- The Rodime 201 Plus and 451 Plus, 20- and 45M-byte internal hard disk drives from Rodime, Inc.'s peripheral systems division in Pepper Pike, Ohio.
- Mac Enhancer, jointly developed by Microsoft Corp. and Softstyle, Inc., which converts a single Macintosh port to four ports and includes driver software for more than 20 printers. Priced at $245, it is available now and is also an upgrade to Microsoft's original Mac Enhancer.

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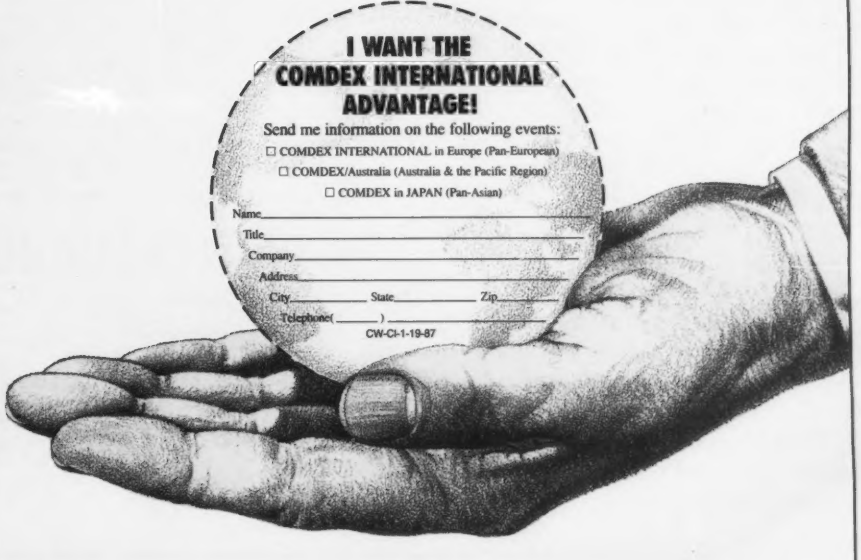

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

Proof of PCs' gains on 3270

After several years of speculation by industry observers and users, evidence is appearing of a serious impact on the 15-year-old IBM 3270 market by personal computers.

There continues to be a growing number of workstations performing 3270-type communications, but the PC impact starts to show when one looks at how those communications are accomplished. It appears much of the growth will be on the part of PCs with 3270 emulation boards.

The evidence is presented by International Data Corp. (IDC), a Framingham, Mass.-based market research firm, in its annual study of the terminals industry. The IDC study predicts minimal, if any, growth of traditional 3270 displays during the rest of the 1980s. That compares with 26% annual growth from 1980 to 1985.

It was 1985 that "represented a critical turning point" for the overall 3270 market, according to IDC. The company predicts future 3270 business — which includes the current generation of 3270 devices, such as the IBM 3170 and 3190 terminals — will be predominantly add-on and replacement business.

Looking at 1985 shipment figures, IDC estimates there were 974,000 new workstations performing 3270 communications. Traditional 3270-type terminals still made up 68.8% of those shipments but, by accounting for 19.8% of the shipments, PCs with emulation boards were gaining momentum as an alternative. IDC concludes, "The 3270

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Connolly is Computerworld's *senior editor, systems & peripherals.*

Fog around 9370 clears

Analysts forecast strength as departmental CPU

By James Connolly

The picture that was so cloudy three months ago, when IBM introduced its 9370 Information System, seems to be clearing.

As information drifts out of IBM and users and analysts take a closer look at the 9370's specifications, answers are more apparent for some of the questions that greeted the Oct. 7 product announcement. People finally seem to have a sense of how the mid-range computer — the subject of many consultants' reports, competitive vendor analyses and MIS managers' casual comments — can be used, how it will perform and what it will cost.

Interviews with various analysts indicate they believe the 9370 can provide the price/performance benefits that IBM's System/36 and 4361 could not offer in competing with Digital Equipment Corp.'s VAX line. Analysts also remarked that the 9370's strength will be as a departmental data processing machine running IBM's VM, rather than IBM's MVS, and that the machine's potential is far greater than has been announced so far.

"My feeling is that the 9370 is far from complete. It is more a statement of direction than a finished product. This one product probably will do more than anything else to define IBM's direction in the computer business," said IBM analyst Thomas Henkel of The Yankee Group, a Boston-based market research firm.

Henkel said that in the past, IBM's goal was to drive all customers up to mainframes. "Even if you bought a personal computer, somewhere down the road they expected to sell you a mainframe. Now IBM has had to admit that there are customers out there who don't want a mainframe under any circumstances," he said.

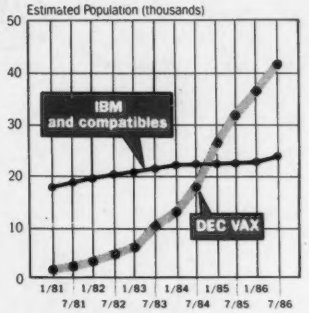
Henkel added that the 9370 has "received a lot of attention for a lot of rea-

See **FOG** page 38

•DATA VIEW

VAX vs. IBM

Digital Equipment Corp. VAX systems pass IBM and compatible mainframe installations in U.S.



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE CORP., OCTOBER 1986

Unix supermini hits tech marts

By David Bright

FT. LAUDERDALE, Fla. — Harris Corp.'s Computer Systems Division is expected to introduce a high-end, Unix-based superminicomputer for technical markets today.

According to Harris, the HCX-9 performs 7.5 million instructions per second (MIPS), provides the fastest response time of any superminicomputer in its price range and offers higher performance in a smaller package than Harris's earlier systems.

Harris will sell the system to end users but will place a new emphasis on OEMs and value-added resellers. This is because the system uses an open architecture based on the VMEbus, the firm said.

Targeted environments include the aerospace and defense industries, comput-

See **SUPERMINI** page 39

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- Lexi Computer offers an IBM-compatible laser printer
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For more on these and other new products, see pp. 59-68.

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"The press says everyone with a telephone will have a CRT within 10 years. We have 12,000 telephoned workers, and the initial hardware, communications and operating software costs alone for a terminal connected to the mainframe run from $12,000 to $25,000. The cost of that would be shocking."

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Fog around 9370 clears

From page 37

sons. The first being that IBM has done such a bad job in the mid-range market." He observed that the confusion that previously centered on IBM's minicomputer offerings, particularly the System/36, means the 9370 "won't be an easy sell." But, he added, the 9370 eases concerns of Fortune 500 customers who want a departmental system but do not want to undertake the software development needed to shift from IBM systems to VAXs.

Another analyst, Executive Director Robert G. Simko of the Los Altos, Calif.-based market research firm International Technology Group, said the first four models of the 9370 — the 9373 Model 20, the 9375 Model 40 and 60 and the 9377 Model 90 — are only the start of the product line.

He said the 9370's price/performance figures will be in line with IBM's policy of providing 30% to 40% price cuts with each generation. He predicted IBM will address the growth needs of existing IBM 4381 customers by introducing a higher-performance replacement for that processor family this year.

Comparison

Noting that the 9370 is an outgrowth of the 4300s, Simko compared it with that older product family. He said the 9373 Model 20 compares with the 4361 Model 3 in power for a lower price and the high-end 9377 Model 90 compares with the 4381 Model 1. The unannounced systems will drive the 9370's performance levels past the 4381 Model 3 while keeping prices a step below the older system's cost. However, Simko and other analysts said the 9370 will not replace the 4381s, which will be replaced by a line of more powerful systems.

Simko said he sees an IBM product line that includes the System/36 and 38 small-business families, the 9370, the 4381's successor and the IBM 3090-class mainframe family.

He said the 9370 offers an upward migration path. He also observed that while the 9370's performance and communications capabilities are comparable with the 4361, what sets it apart for the Fortune 500 marketplace is the way IBM is promoting it as part of a top-to-bottom, host-down-to-PC solution. "What IBM is saying is that they aren't just selling a box," Simko said.

Without a good, low-end 370-architecture machine, IBM has missed opportunities for new business, with DEC taking advantage of that failing, Simko said. However, he defended the 1983 introduction of the System/36 by IBM's System Product Division (SPD), saying the minicomputer "has been a good holding action for IBM" that has kept traditional IBM customers from jumping to DEC before the release of the 9370. He said the 9370 provides customers with a "clear-cut statement of direction for SPD," which has been a division in flux for several years.

Too early to tell

Both Henkel and Simko said it is too early to tell how easy it will be to use the 9370. Simko observed that IBM has been working to make key VM applications easier to use and more affordable. Henkel said office automation software designed for the 9370 may be two years away and that there is no assurance that a simplified version of VM, currently under development and known unofficially as VM Desk, will satisfy the unsophisticated user.

Analyst Craig Symons of the market research firm Gartner Group, Inc. in Stamford, Conn., agreed that the 9370 fails to provide the unsophisticated user with an uncomplicated machine. He differed with the analysts who said the 9370's role is becoming clear, and he said the software issue raises more questions.

"IBM has billed it as a departmental computer, but I don't see it as a departmental computer. It's a small mainframe," Symons said. Pointing out that IBM claims users can move mainframe applications to the departmental level, Symons said the 9370 will not support many mainframe users' applications because it does not run MVS/XA, even though it runs MVS. "The fact of the matter is that the 9370 is still a VM machine," Symons declared.

However, Symons added that the 9370 offers dramatically lower prices than the 4361 and allows long-time IBM MIS shops to stay with IBM, rather than switching to DEC if they want to implement departmental computing.

An analyst who admits he is "bullish on the 9370" is Rick Martin, research analyst for Sanford C. Bernstein & Co., a New York investment firm. Martin, a former IBM product manager for the 4300 line, said he expects "a lot of spiffy office automation software" to come out of a development project IBM is doing for its first 9370 customer, United Air Lines.

Martin said customers running VM on the 9370 can have a clerical worker operate it and an MIS professional handle the troubleshooting. But he said MVS, even on a 9370, will continue to need professional operators.

However, Martin, like the other analysts, pointed to price and performance as the key differentiation for the 9370.

"IBM is slowly releasing information about it, and the price/performance is better than it looked at first in commercial applications. In scientific [applications], it is significantly better than anything out there," Martin asserted.

He also claimed the pricing structure gets even better when one con-

See FOG page 39

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Supermini hits tech marts

From page 37

er-aided design (CAD), computer-aided manufacturing, computer-aided engineering, universities and technical administration.

Typical applications in those environments include data acquisition and reduction, research, product design, real-time simulation and software development, the vendor said.

For example, an HCX-9 system will be used for Unix software development at the University of California at Berkeley.

Updating Unix

That school's Computer Systems Research Group is creating an updated version of Unix, according to Harris.

The system is built around a proprietary processor that reportedly operates at 7.5 MIPS with Fortran programs and at 8 MIPS using the C language.

The system's dual VMEbus architecture is said to provide 40M byte/sec. of throughput per I/O bus, giving it almost four times the total I/O throughput of the earlier HCX-7.

Supports 256 users

According to Harris, the high-performance I/O bus enables the system to support as many as 256 users without significant performance degradation, particularly in disk-intensive applications such as CAD, software engineering and data base management.

The system runs Harris's HCX/UX operating system.

This system embraces both AT&T's Unix System V.2 and the University of California at Berkeley Unix Version 4.2.

HCX/UX uses a switch that enables the two Unix versions to access the other version's libraries and utilities.

Base configuration

The base configuration of the system costs $195,500.

This configuration includes 4M bytes of random-access memory, an eight-slot VMEbus, an I/O controller with eight asynchronous serial ports, a 32-user Unix license and a C compiler.

Shipments are scheduled to begin in March.

PCs gaining on 3270

From page 37

display's current dominance is shifting and is proceeding into a slower-growth, commodity-pricing phase of its life cycle."

IDC says ASCII terminals with protocol converters and IBM 3270 Personal Computers hold their shares of the market, but PCs with emulation boards and increasingly better software represent a higher-growth market than those alternatives.

However, it should be noted that a variety of factors are responsible for this market shift. IDC points to the maturation of the 3270 market itself, the decline in large-scale system growth, eroding margins in the display business, commoditization of the PC and the availability and popularity of micro-to-mainframe links.

"Singularly, none of these factors completely explain 3270 market dynamics as they exist today. Only taken together can these topics begin to make sense of the erratic and volatile state of 3270 display business," the report says.

Fog around 9370 clears

From page 38

siders IBM's tendency to offer discounts. "The list price is almost meaningless when you're buying 10, 20 or 100 of these. Then you get into the 30% discount range," he added.

Martin said a final cost benefit for the customer will be in the area of peripherals, particularly products such as the IBM 9335 and 9332 disk drives, which can be attached directly to the 9370 system bus rather than through channel attachments. He said the disk drives, announced in June, are "incredibly cheap," and that discounts on those products will run deeper as customers buy more.

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1. Write your DIAL-INQ subscriber number in the boxes in step 4.

2. Identify those products/services for which you're requesting more information. Write their respective DIAL-INQ reader service numbers in the boxes provided in step 6.

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Dial 1-413-637-3170 anytime, 7 days a week, 24 hours a day.

4. When prompted by the instructional recording, enter your DIAL-INQ subscriber number and symbols as recorded below.

☐☐☐☐☐☐☐☐☐ [#][#]

5. When the recording says, "Enter magazine code and issue code," enter these numbers and symbols:

[1][4][5][#][7][0][3][#][#]

6. You will be prompted to enter the DIAL-INQ number, including the symbols, for the first product/service you've identified below. You will be prompted to repeat this step as needed to input additional DIAL-INQ numbers.

To key in more than 17 inquiries, simply make another telephone call once you've signed off from the first.

1. ☐☐☐[#][#]
2. ☐☐☐[#][#]
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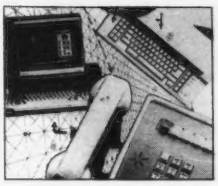
7. Complete your phone call by entering the following symbols:

[#][#]

You've now successfully completed your inquiry call to *Computerworld* DIAL-INQ. Remember . . . you can make as many phone calls as you wish — and request information about products/services in any SPOTLIGHT section up to three months from the issue date.

INSIDE



Voice and Data

Integrated voice/data terminals are gaining entry to the executive level with new convenience and efficiency features like hands-free dialing, appointment calendar and reminder list functions and electronic mail. Page S8.

Campus Connection

The University of Massachusetts considered versatility a primary requirement when it looked for a product to provide access across its several separate campuses. Page S7.

Ask the Vendor

Users get answers they need about availability, capability and service. Ranges from advice for owners of discontinued products to upgrade suggestions for the protocol-deficient. Page S2.

VDTs at a Glance

A conprehensive chart of who offers what in video display terminals, arranged for easy comparison of features, compatibility and pricing. Page S10.

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As microcomputers develop terminal-like capabilities, VDT makers are enhancing, price cutting, merging or dropping out

VDTs: DOING MORE FOR LESS

BY JOANN M. GRANGER

ANTHONY RUSSO

The current state of the display terminal market can be summed up in one word — competitive. From without, corporate acceptance of microcomputers, fueled by declining prices, is eroding the high end. From within, terminal vendors are scrambling to attract users and capture market share with a steady stream of new products and enhancements.

A number of firms are using micros as multipurpose workstations that duplicate some of the functions traditionally performed by terminals. As links to mainframes improve, more micros will be able to perform terminal-like tasks.

However, with an estimated 10 million units currently installed throughout the U.S., the video display terminal industry will remain an important part of the office environment for the forseeable future.

Many manufacturers have found that to maintain a competitive edge and still offer a quality product, they have had to go to offshore manufacturing — primarily in South Korea and Taiwan. Because labor costs in these environments are kept to a minimum and quality remains consistent, the customer benefits in terms of more functionality per terminal dollar.

Lower prices have reduced profit margins for terminal vendors and have stiffened competition. This situation has prompted some vendors to bolster their financial situation through mergers and acquisitions.

Among firms choosing this route are Zentec Corp., which acquired Lear Siegler, Inc.'s Data Products Division late last summer; Phaze Information Machines Corp., maker of IBM 3270-compatible terminals and workstations, which became a wholly owned subsidiary of Lee Data Corp. in 1985; Hazeltine Corp. which agreed in 1983 to sell its computer terminal equipment product line to a group of its management employees who formed Esprit Systems, Inc.; and NCR Corp. which acquired Applied Digital Data Systems, Inc. (ADDS) in 1981.

The major focus in this market is on functional capabilities. These include editing, highlighting, protected field, split-screen functions, color screen and ergonomic housing, to name a few.

Independent vendors tend to follow the lead of the larger vendors when offering such improvements. In a few instances, however, independents have taken the initiative to introduce terminal enhancements to major systems before the original manufacturer does.

This action, of course, pressures the original manufacturer to beef up the parent system, leading to a volleying back and forth to see which company can top the others by offering, in one package, the most features and functions at the lowest cost.

The display terminal market is divided into two distinct segments: the ASCII side and the IBM 3270 side.

The larger of the two is the ASCII, with regard to the number of vendors, units marketed and quantity sold.

The ASCII standard of communication is a coded character set introduced by the American

Granger is a research associate for *Datapro Reports on Data Communications*, published by Datapro Research Corp. in Delran, N.J.

VDT vendor competition

CONTINUED FROM PAGE S1

Standard Code for Information Interchange. It consists of 7-bit coded characters — 8 bits including parity check — used for information exchange among data processing systems, data communications systems and associated equipment. The ASCII set consists of alphanumeric characters, control characters and graphics characters.

The ANSI X3.64 standard, which is a subset of the ASCII character code, is a transmission code set forth by the American National Standards Institute. Both ASCII and ANSI devices transmit data asynchronously.

The primary contender in the ASCII/ANSI marketplace is Digital Equipment Corp. with the VT100 family and its successor, VT200 terminals. Prior to its recent discontinuance, the VT100 was the most widely emulated ASCII terminal with more than one million units sold.

This terminal, which is used chiefly with DEC's VAX line of computers, created an emulation market second only to the IBM 3270 market in size.

The VT100 offered what the business public was looking for. In its basic configuration, it displayed 24 lines of 80 characters or 14 lines of 132 characters. It featured a 12-in. (diagonal) display screen and detachable typewriter-style keyboard.

When the VT100 was introduced, DEC had not anticipated, and was unable to meet, the huge demand for the terminal. Lead time for delivery was often three to five months. This delay provided a window of opportunity into which several competitors slipped with VT100 emulators. Having apparently learned from this experience, DEC made sure the VT200 family of terminals was readily available upon its introduction.

In November 1983, DEC introduced the VT200 family of video display terminals intended to replace the VT100 models. These terminals, of which there are currently three versions, feature full VT100 compatibility and provide the user with an improved price/performance ratio over that found on the VT100 terminals.

Because of their compact, modular design, the VT200 terminals require less desk space than their predecessors.

The most popular member of the VT200 family is the VT220, which, like the VT100 before it, has acquired a large following of independent emulators. Because of the initial demand for the VT220, DEC raised the terminal's price from $1,295 to $1,395.

However, confronted with competitors offering clones for as little as $795, DEC reversed the increase and knocked $200 off the original price of this model. The VT220 was reduced another $300 in November of last year, bringing the current list price down to $795.

The VT220 is a general-purpose interactive display that features a 12-in. monochrome display, 80- or 132-char. column display capability and a detached keyboard. The VT240 offers both text functions and graphics capabilities, with two graphics protocols available: DEC's Regis and Tektronix, Inc.'s 4010/4014.

DEC's VT241 is a color text and graphics terminal combining the features found on the VT220 and VT240 with color display capability. All models in the DEC VT200 family conform to the ANSI X3.64 standard of communications.

The current leaders in the ASCII/ANSI field include DEC, Wyse Technology, Inc., Televideo Systems, Inc., ADDS, Esprit Systems and ITT's Qume Corp.

For years, Televideo, Lear Siegler, ADDS and Esprit Systems (then Hazeltine) dominated the ASCII terminal market. In August 1981, Wyse Technology was formed and began shipping its first product, the WY-100 smart terminal, in April the following year.

Attention to such considerations as ease of use, quality, compact design, competitive price and attractive styling have helped Wyse capture what is generally considered the No. 1 spot.

Despite being a relative newcomer to the industry, Wyse has managed to carve out a healthy share by combining advanced features with low prices. When Qume, an ITT subsidiary, broke the $400 price barrier by introducing the QVT 101 in 1985, Wyse quickly responded with the WY-30.

This entry-level smart terminal emulates the ADDS Viewpoint A2 and Regent 15; Lear Siegler ADM3A/5 and ADM 31; Televideo 910, 910+, 925 and 925E; and the Wyse WY-50 and WY-100.

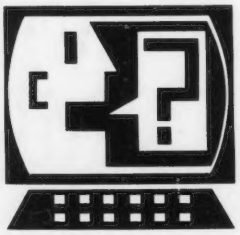
Wyse offers the WY-50 smart terminal and an enhanced version, the WY-50+. Terminal emulations available on these models include the Lear Siegler ADM 31 (native mode); Televideo 910, 920, and 925; ADDS Viewpoint; Hazeltine 1500; and WY-100.The WY-50+ further emulates the Data General Corp. Dasher D200, IBM 3101, and Televideo 950.

The WY-60 is a smart, flat-screen terminal that offers the widest array of enhancement features incorporated into a Wyse terminal. An added bonus

Continued on page S6

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.



The Applied Digital Data Systems, Inc. 2020 terminals we use have block-mode capability, but they cannot do edit checks on fields like some of the more expensive terminals. Why is this capability not included in this type of terminal?

James Mercer
Manager of MIS
CMP Publications, Inc.
Manhasset, N.Y.

ADDS: The vast majority of users who would likely be in the market to purchase a 2020 are not utilizing block-mode transmission. Whereas this feature would be a perceived advantage to a block-mode user, the number of people who would benefit from its incorporation would be minimal.

In addition, software developers tend not to write code for block-mode transmission, but rather they prefer conversational mode, thereby allowing maximum control via the host computer.

Will a future release of the Digital Equipment Corp. VT220 include graphics capability?

Dave Duitscher
Hardware manager
Salisbury State College
Salisbury, Md.

DEC: Digital has pursued a strategy of providing a high-quality text terminal, designed especially for text applications, choosing not to integrate the additional functionality and cost that would accompany a graphics product.

If a customer does need graphics capability, Digital has products available to meet those requirements in different and higher price ranges.

By pursuing this strategy, Digital can minimize the cost for those who have text-only requirements.

Is there any way to obtain graphics capability on Hewlett-Packard Co. 2392A terminals without having go to the expense of replacing them completely?

Also, when will the price of color monitors be reduced to a more accessible level? For example, will they ever be as inexpensive as monochrome monitors?

Michelle Johnson
Information systems specialist
Cathedral City, Calif.

HP: Although there is not graphics capability on the HP 2392A, a 64-char. line drawing set is standard on this product. This can be used for simple graphics and to emulate forms.

The HP solution for graphics is the 2393A graphics terminal or the 2397A color graphics terminal. Due to the relative difference in complexity of design and cost of materials required to build color and monochrome monitors, there is a difference in price between the two.

We will, however, see the cost of color and monochrome monitors fall over time, resulting in a narrowing of the color/monochrome price delta.

With the plan to discontinue HPWord, what alternative will users of HP 2392A terminals have for word and text processing?

Darlene Litcher
Manager MIS branch
U.S. Department of Energy
San Francisco

HP: Hewlett-Packard has no plans to discontinue HPWord. The HPWord terminals, 2626W and 2628A have been discontinued; however, customers with installed bases of these terminals using HPWord on our current family of HP 3000 systems can continue using HPWord for many years.

Additionally, the HP 150 Touchscreen PC is supported as an HPWord/3000 terminal. The 2392 terminal has never supported HPWord, but two products are available for text processing for the 2392 — HPSlate and Text and Document Processor.

HP's direction with word processing is to move the functionality to the personal computer. Today we have HPWord/150 for the HP Touchscreen PC. The PC versions work stand-alone, and documents can be easily exchanged with terminal-based HPWord users.

Why did the supply of 3178 terminals suddenly disappear in September 1986? And why was there no warning that they would not be available?

Alen Baker
Manager of distributed systems
Duke Power Co.
Charlotte, N.C.

IBM: Ongoing demand for the 3178 has exceeded expectations, so we have had to put them on limited availability. The "roll-your-own" keyboard option first announced with the 3178 allows users to design keyboards for specfic applications, and some apparently are so comfortable with these keyboards that they have been slow to opt for the upgrade — the new IBM 3191 display, which offers more function, better ergonomics and a lower price.

I'm gettting better response time for 40% to 60% less cost than IBM on third-party service contracts for the 3000 series terminals. Because of this, I'm switching over to third-party service vendors. Why can't IBM's prices for maintenance contracts be competitive with the third-party service industry?

Bob Adams
Corporate workstation administrator
Chevron Corp.
San Ramon, Calif.

IBM: There are a lot of factors involved in competitive pricing of service contracts, so we can't speculate with regard to the contract mentioned.

IBM seeks at all times to keep our customers' service and repair costs as low as possible. This is one reason why we have introduced three-year warranties on our new display stations.

Why don't the Wyse Technology, Inc. WY-50 terminals we use incorporate standard screen-handling protocols, such as those recommended by the American National Standards Institute?

James Mercer
Manager of MIS
CMP Publications, Inc.
Manhasset, N.Y.

Wyse: The WY-50 is a full-function terminal designed for the general-purpose ASCII market. As a result, it does not incorporate ANSI protocols.

The most sophisticated terminal in the Wyse product line, the WY-60, incorporates both ASCII and ANSI standards.

The ANSI X3.64 specification provides for standardized display protocols and command sets. Screen handling commands such as video attributes and cursor-positioning sequences are included in this specification.

WY-60 users can select from among 17 different ASCII modes or one of three ANSI/DEC compatible modes — such as the WY-75 ANSI, DEC VT52, or DEC VT100 — depending on which mode is best suited for their application.

Introducing the most reliable DEC™-compatible terminal ever built. The TeleVideo 9220.

"Why do we want thousands of TeleVideo® terminals? Because we can't afford thousands of problems."

Susan Kennedy should know. She's a product analyst at Leasametric, a company that rents, sells, and services DP equipment all over the country. Including thousands of terminals. And since reliability is crucial to Leasametric, they tear each evaluation unit apart piece by piece. Then, they give it a series of tests that make MIT exams look easy.

"Too many terminals just don't measure up," says Susan. "I've seen machines with questionable ergonomics...keyboards that flex in the middle when you type... even cheap little diodes that could drop off.

"But TeleVideo starts with solid engineering, and follows through with every detail. Overall, they've built the same quality into the 9220 that's made all their other terminals last so long."

And there's more to the 9220 than quality and reliability. There's also an extended feature set, including full VT-220 compatibility. A super-dark 14" amber screen. A tilt and swivel base. 30 programmable function keys. Plus the best thought-out ergonomics around. All for exactly $619.

The TeleVideo 9220. For more information, or the name of your nearest distributor, call 800-835-3228.

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THE OTHER THREE INITIALS IN THE 3270 WORLD. AND

COMPLETE COMPATIBILITY.

That's what you get with the AT&T 6500 Multifunction Communication System. And you get it in both SNA/SDLC and BSC protocols.

Which means for the first time, you have a real choice in 3270 Systems. From a company every bit as solid as Big Blue.

SYNCH. AND ASYNCH.

The AT&T 6500 will tie together data and applications from up to three synchronous and 16 asynchronous hosts. Not to mention allowing PCs to work as terminals.

What's more, you can switch between synchronous and asynchronous hosts with a single keystroke.

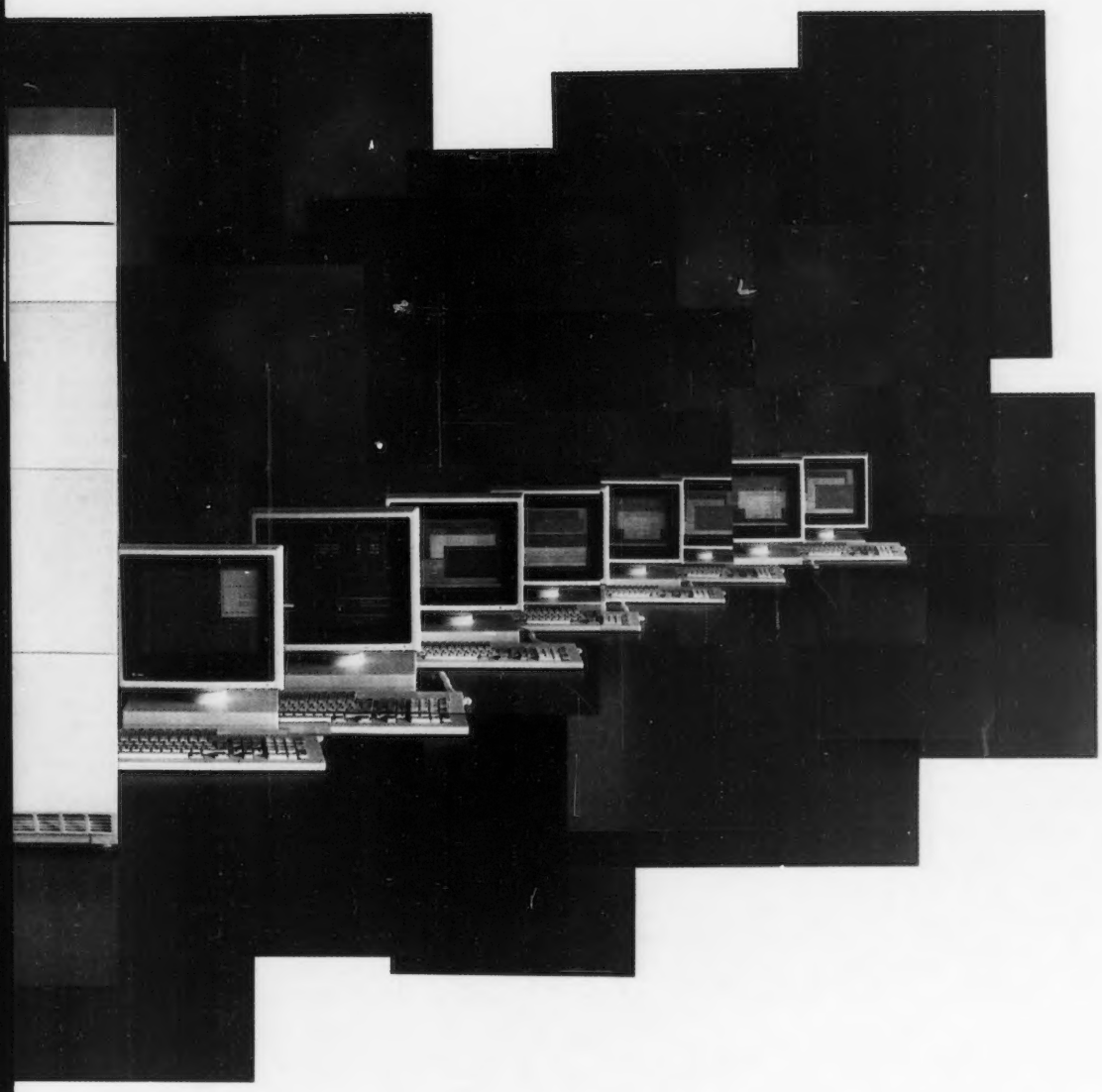
FOUR WINDOWS.

The 6500 lets you create up to four windows at the same time—into both synchronous and asynchronous hosts—and freely pass information among databases.

For example, an inside salesperson taking an order could access: the customer's credit status in one host; relevant inventory information from another host at a completely different location; and the order form to fulfill the request from yet a third host.

All on a single screen.

That kind of power means big productivity gains with no outlay for costly systems and applications development.



FIVE REASONS TO GIVE THEM A LONG, HARD LOOK.

PEACE OF MIND.

The 6500 incorporates AT&T's experience with three previous generations of 3270 equipment. Plus the kind of service that smaller companies just can't provide.

And we make the pieces fit. Modular architecture assures you of smooth system evolution: upgrading doesn't even require a new communications controller; and you can easily reconfigure your system with almost no disruption.

That's what you'd expect from the company that makes "The Computers With The Future Built In."

AND VALUE.

Even with performance that matches or surpasses comparable IBM* equipment, the AT&T 6500 looks a lot better on your balance sheet.

So before you decide on 3270 compatibles, call your AT&T Account Executive, or simply dial 1 800 247-1212.

We'll get you a lot to look at.

AT&T
The right choice.

CONTINUED FROM PAGE S2
is that Wyse dropped the list price of this model in November from $699 to $599.

Standard emulation modes available include Dasher D200; Lear Siegler ADM 3A/5/31; Televideo 910, 920, 925 and 950; ADDS A2/60; Hazeltine 1500; and IBM 3161. The WY-60 also includes ANSI modes. The WY-75 is a version of the WY-50 that emulates the DEC VT100 and conforms to the ANSI X3.64 standard.

Also compatible with ANSI X3.64 is the WY-85, which emulates the DEC VT220. Rounding out the Wyse offerings is the WY-350 color display with smart terminal features. Up to 64 different colors can be displayed using this model.

Televideo Systems, founded in 1975, began commercial shipping of video display terminals in March 1979. Within a year's time, the company propelled its way to the front of the line of independent suppliers, a position it retained for the next five years.

Market position slipping

During the past year, Televideo has found its competitive position in the display terminal market slipping, due largely to the company's foray into the microcomputer market. During its recent periods of declining sales, its competitors have been active in their attempts to increase market shares.

In an effort to regain the spotlight, Televideo signed a five-year joint marketing accord with Ambi Corp. and purchased slightly less than 10% of Ambi stock. Ambi is a manufacturer of integrated voice/data terminals (see story page S8).

The display terminal product line now offered by Televideo consists of four models, each featuring improved ergonomics, editing capabilities and graphics characters. The Model 955 and Model 905 smart terminals are designed for the general-purpose ASCII market. The 905 is compatible with the Lear Siegler 3A/5A, Hazeltine 1410/1500, ADDS A2, ITT Qume QVT 101 and Televideo 925 and 910.

The remaining two models offer compliance with the ANSI X3.64 standard. Of these ANSI units, the Model 9220 is DEC VT220-compatible, and the Model pT100 is DEC VT100-compatible.

Founded in 1969, ADDS has been a long-time leader in the ASCII terminal market. In 1981, it was acquired by NCR and since has been considerably strengthened by the backing of this computer giant.

The introduction of the Viewpoint series in March 1981 proved to have a sharp impact on the ASCII terminal market. With a unit price of $650 (currently $595), the Viewpoint was priced significantly lower than any comparable terminal on the market at that time. ADDS' competitors responded by adding new models or reducing prices on established models.

The Viewpoint terminals replaced ADDS' highly successful Regent terminal line. In addition to conversational and smart terminals, ADDS has introduced low-price color models as well as terminals that are IBM compatible when used in conjunction with a protocol converter.

Three new models in the series offer tilt display and a detached keyboard, with a small footprint design. The ADDS 1010, introduced a few months ago, is an entry-level display terminal priced at $395. This terminal features a built-in parallel printer port.

The Viewpoint+, a version of the original Viewpoint, provides emulation of three older Viewpoint models: A1, A2 and 3A+. The Viewpoint/Color is a smart editing terminal that is capable of displaying eight colors. Also a smart editing terminal, the Viewpoint/60+ is an enhanced version of the Viewpoint/60.

The Viewpoint/78 is a conversational terminal that provides IBM 3278 emulation when used in conjunction with a protocol converter, and Viewpoint/78 Color is a color version of the Viewpoint/78 that offers display in four colors on a black background. The smart Viewpoint/90 offers mosaic graphics and line drawing graphic capabilities and Viewpoint 122 is an ANSI terminal that is compatible with DEC VT220, VT100 and VT52.

Esprit product line

Esprit System's product line currently consists of five models. The ESP 6110+ is a smart terminal that offers full editing features and a variety of emulations. The terminal's most impressive feature however, is its price — $395.

The ESP 6515 ANSI model emulates the VT220 and operates with DEC's Decsystem-10 and Decsystem-20 accounting/data base package and the DEC PDP-11 RSTA data inquiry application. The ESP 6310 includes all the features of the 6110+ as well as additional emulations.

Featuring eight displayable colors, the Esprit III Color is priced lower, at $995, than comparable models by ADDS and Wyse. Esprit's Opus 2 mid-range ASCII terminal provides advanced design and system enhancements. It incorporates a 14-in. flat screen with a touch-tilt and swivel mechanism. It emulates the WY-50, Televideo 925 and 910, ADDS Viewpoint and Esprit ESP 6110+ Hazeltine mode.

ITT Qume Corp., a leader in the printer market for the last several years, entered the general-purpose ASCII terminal market in 1982 with the introduction of the QVT product line. In early 1985, the company shook the market with the introduction of the $395 QVT 101. This smart terminal became the first product of its kind to break the $400 price barrier.

The price war was on again. In a few months, Lear Siegler and Wyse countered

"Within 10 days we had the names of the best distributors in three foreign countries."

For nearly two decades, Land Grant has been involved with high tech in a variety of capacities. He is president of Land Grant & Company — a business devoted to export consulting and profitable concepts in global trade for high technology producers.

Land realizes the importance of networking in international business. And, he's been using CW International Marketing Services to help him expand his list of distributor contacts. *"CW's worldwide offices are nodes on a network — in touch with current trends as well as the customers and international middlemen U.S. manufacturers are seeking,"* he explains.

Land discusses how CW International Marketing Services helped his client, Phoenix Technology: *"Locating qualified candidates was one of our first steps in helping Phoenix select the right distributors. Within 10 days, we had the names of the best distributors in The United Kingdom, West Germany and France."*

CW International Marketing Services is the only source, aside from the Commerce Department, that provides comprehensive distributor information broken down by country and product line. *"For years, we had to gather and cross-reference distributor information from a hodge-podge of government and international trade sources. Now, CW provides us with a better source of fast, top-drawer information,"* says Land.

In fact, selected international market information is so scarce, Land is currently writing a guide entitled the *High-Tech Exporter's Sourcebook.* And he plans to continue relying on CW International Marketing Services for distributor contacts. He explains, *"The real added value of CW is its people and expertise in-place around the world."* He adds, *"Because CW Communications is a network of international offices, CW International Marketing Services has worldwide contacts and marketing information unavailable elsewhere."*

To find out how CW International Marketing Services can work for you, call Frank Cutitta, Managing Director, at 800-343-6474 (in MA, 617-879-0700).

Land Grant
President
Land Grant & Company
Brooklyn, NY

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Qume's QVT 101 with new sub-$400 units of their own.

Other members in this family include the QVT 103, QVT 201 and QVT 202, all of which are compatible with the ANSI X3.64 command and emulate DEC VT100 and/or VT200.

Featuring emulation of Televideo's 925, 920 and 912 is the QVT 108 smart editing terminal. The QVT 109, another smart terminal, provides menu-selectable emulation of the ADDS Viewpoint A2.

No conquest for IBM

Despite competitors' fears, IBM's 1979 entrance into the ASCII terminal market did not herald yet another conquest for Big Blue. IBM's first offering, the 3101 terminal, was priced about 20% higher than the competition and was made available for purchase only, with quantity discounts available for high-volume orders. As of today, the 3101 has not achieved the popularity enjoyed by some of the older, established lines of ASCII terminals or even many of the new start-up companies.

IBM tried again in 1985 when it introduced the 3160 family of display stations. More competitively priced, the 3160 terminals offer emulation of other popular ASCII terminals. The 3161 provides emulation of terminals from ADDS, Lear Siegler, Esprit and Televideo. The 3163, via its optional plug-in cartridge, puts IBM in the DEC-compatible market with VT100 and VT52 compatibility.

The second significant market segment is the IBM 3270-compatible market, the single largest subset of the display terminal market. The current installed base of 3270-type terminals consists of more than three million units. Of that, approximately half are IBM terminals; the rest are 3270-compatible models from independent manufacturers.

IBM's major competitors in this market include Telex Computer Products, Inc., ITT Courier Terminal Systems, Inc., AT&T, Lee Data and Memorex Corp. Telex Computer Products, Inc. provides plug-compatible replacements of various members of the 3270 family. This compatibility allows Telex terminals to be attached to IBM controllers or vice versa. Memorex Corp. also makes plug-compatible replacements for various 3270 components. AT&T and Lee Data provide functional compatibility via their 3270-compatible product lines.

The families of display terminals now available as a part of the IBM 3270 Information Display System include the 3276 Controller/Display Station, the 3278, 3178 3180, 3179, 3191, 3193 and 3194 Display Stations and the 3279 Color Display Station.

Lee Data was the first of the 3270-compatible vendors to offer multiple-host — asynchronous and synchronous — access from a single cluster controller along with windowing and partitioning features on its 3270 display stations. AT&T followed suit by offering the 6500 Multifunction Communication System. Now, IBM offers these features via the 3174 controller and the 3193 and 3194 display stations. IBM has gone one step farther by providing imaging capability on the 3193.

Currently, the No. 1 competitor in the IBM 3270 market is Telex. In 1976, Telex purchased Terminal Communications, Inc. and entered the 3270-compatible terminal business. In June 1984, the company reached an agreement with Raytheon Corp. to purchase the installed base, receivables and inventory of Raytheon Data Systems.

Like all of the independents who must compete with IBM, Telex offers a broad line of competitive products priced somewhat lower than those of IBM. One of the results of the stiff competition in the 3270 market is a trend toward display terminals with not only lower prices, but a more compact design.

Telex's 270 Information Display System is a family of plug-compatible replacements that compete directly with corresponding IBM models. The display terminals included in this system are the 078, 079, 080, 179, 180-1, 279-3A, 1186, 1260 and 1280. The 078 contains a 12-in. display screen with a 1,920-char. screen capacity. It is a plug-compatible replacement for the IBM 3178. The 079 color terminal is the color counterpart to the 078 and displays in red, green, blue, yellow, turquoise and pink. The 079 is an alternative to the IBM 3179 color terminal.

Offering four character screen sizes, the 080 is a 15-in. monochrome display supporting the direct attachment of light pen and message printer. It attaches directly to an IBM 3274/3276 controller or comparable Telex control unit. The 179 color terminal displays seven colors on a 14-inch monitor and offers three selectable screen sizes. It is a plug-compatible alternative to the IBM 3179-2.

An alternative to the IBM 3180 is the Telex 180-1. It features four user-selectable screen sizes on a 15-in. monitor.

Last is the 279-3A Color Graphics Terminal, featuring a 14-in. screen with a 2,560-char. display capacity. It is a plug-compatible replacement for the IBM 3279-S3G.

Courier Terminal Systems became ITT Courier Terminal Systems Inc., a wholly owned subsidiary of ITT, in March 1978. Since that time, it has gained a significant presence in the computer industry. In April

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USER PROFILE
Campuses access UMass MIS

BY STANLEY GIBSON

Although its main campus in Amherst, Mass., sits amid the rolling hills of the Connecticut River Valley, the University of Massachusetts resides in other locations in Worcester, downtown Boston and in Dorchester, overlooking Boston Harbor.

The university's MIS department must give its users at any of the locations across the state access to computers in other sites, particularly at the university's computing center in Amherst, which is where all student records are stored on a National Advanced Systems Corp. (NAS) 9040 mainframe.

Since January a year ago, the two Boston campuses have both used Lee Data Corp. terminals to carry out IBM 3270 sessions as well as asynchronous transactions. "Lee Data was the only one that offered 3270 and async," says Charles Boland, the university's director of computing services at the Boston Harbor campus.

Users of the terminals can log on to four systems at once, consisting of up to four 3270 sessions and one asynchronous session and one PC session. The terminals also have the capability to create windows of the various sessions, and information can be copied from a 3270 screen to a personal computer program via the terminals' notepad function.

"It's a godsend to our users. It makes life easy," Boland says, praising the functionality of the Lee Data terminals. "The users have a lot of 3270-type work going to a NAS 9040. But they also have Digital Equipment Corp. VAX needs," Boland says.

Meanwhile, other users with primarily asynchronous needs use Televideo Systems, Inc. 925 terminals that communicate with the mainframe 3270 controller through a protocol converter. "The goal was to make it as comfortable as possible for a high portion of a user's work," Boland says.

Physical comfort for the users was also a factor in product selection, according to Boland, who points out that the Lee Data terminals are equipped with a detachable keyboard in addition to a tilt-and-swivel monitor. "At that time, the legislature had a bill mandating ergonomic features in state computer equipment purchases," Boland explains. Although that bill was never passed, selecting terminals with better ergonomic features appeared to be a good idea, he recounts.

> THE goal was to make it as comfortable as possible for a high portion of a user's work.
>
> Charles Boland
> University of Massachusetts

The initial Lee Data contract specified 60 terminals, five controllers, five printers and three IBM Personal Computer clones, at a price of $175,000. Boland has since added controllers, printers and some 40 terminals to the system.

Boland aims to increase response time in the Boston location by purchasing a new Lee Data product, the 525 terminal controller. The 525 will increase the controller-to-terminal speed to 56K bit/sec. from the present 9.6K bit/sec. The reason for the increase, he says, is that "when users travel to Amherst, they notice a faster response time." The faster speed, he says, is not a necessity but a convenience that should make people more productive.

Terminals such as Lee Data's, with a variety of capabilities, are particularly welcome, because, Boland says, he is committed to being a multivendor shop. "We don't want to be tied to one vendor and locked in," he says.

Further, because the university is run by the state, Boland is obligated to select the lowest bidder that meets the contract's specifications; he cannot choose a vendor for the sake of consistency or for intangible reasons.

But Boland says he enjoys selecting the best bidder from many different vendors, regardless of state purchasing guidelines. "It's not so much the state process, but just trying to get the university the biggest bang for the buck."

Gibson is a *Computerworld* senior writer

Checking a ledger file: *UMass staff members make use of a Lee Data VDT*

Integrated voice/data terminals make appearances in offices by capitalizing on business's reliance on the telephone

VOICE FOR MANAGERS

BY JOANN M. GRANGER

Integrated voice/data terminals are beginning to win friends in high places, but the corporate ladder has proved to be a tough climb. With tasks such as typing and report generation still regarded as clerical work, many executives have been reluctant to admit these machines into their own offices.

However, taking advantage of corporate America's reliance on the telephone, Northern Telecom, Inc. was able to get its foot in the door with the introduction of the Displayphone, and through that opening other vendors have followed.

The Displayphone integrates data and voice capabilities using a conventional telephone handset and accompanying telephony features. The addition of these telephony features to a conventional display station makes the resultant products much more attractive to the executive.

Last September, five years after introducing the Displayphone, Northern Telecom announced its second generation, comprising four models. Each model features basic data and voice capabilities as well as electronic mail.

The Displayphone 220 and Displayphone Plus are standalone units, the SL-1 Displayphone is designed for use with the Meridian SL-1 integrated services network, and the fourth unit is designed for the international market.

Rolm Corp., now a subsidiary of IBM, entered the integrated voice/data terminal market with its Cypress terminal in 1983. This unit provides IBM 3270 compatibility — via the Rolm IBM Gateway — and Digital Equipment Corp. compatibility as well as one-button access to Rolm Phone Mail.

Rolm's Cedar and Juniper I arrived in November 1984. The Cedar is an IBM Personal Computer-compatible version of the Cypress. The Juniper I offers compatibility with the IBM PC and PC XT.

The Juniper II, announced in October 1985, features all of the capabilities of the Juniper I plus compatibility with the IBM PC XT and compatibles.

AT&T's three integrated voice/data terminals are designed for use with the company's System 75 and System 85 private automatic branch exchange (PABX).

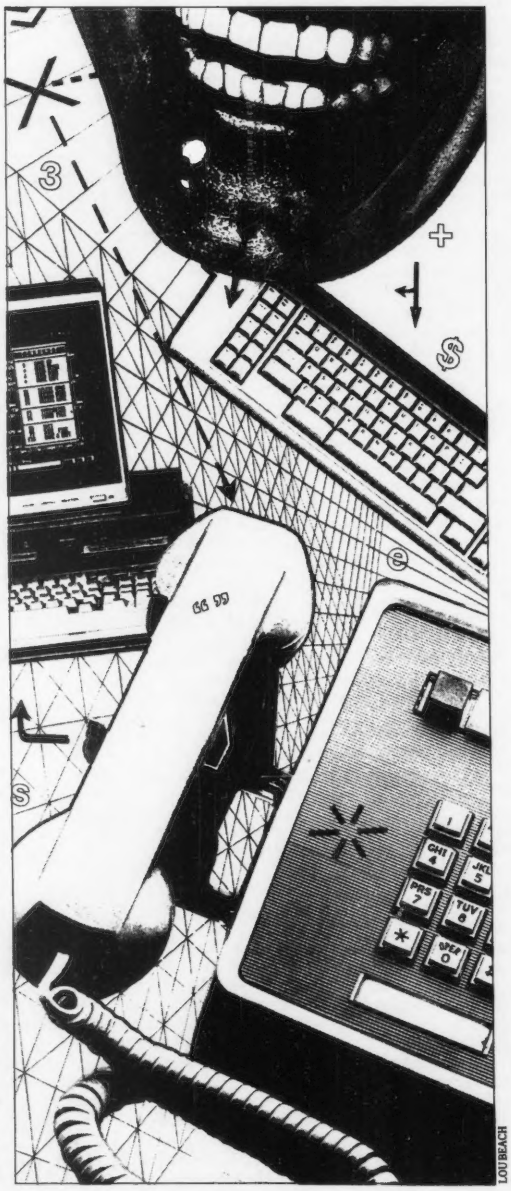
The BCT 515 debuted in June 1983 and offers synchronous and asynchronous communications capability. The Personal Terminal 510A, which is analog, and 510D, which is digital, announced in June 1985, were the first voice/data terminals to incorporate a touch-sensitive screen.

Intecom, maker of the IBX family of PABXs, produced the Keystone integrated terminals in 1985. This unit provides all of the voice features of the IBX, plus data features including IBM and DEC terminal emulation and Wang Laboratories, Inc. Professional Computer attachment capability.

GTE Communication Systems brought to market the XT300 Actionstation in September 1982, which was replaced with the XT300E in August 1984. This integrated terminal provides full voice and data capabilities as well as access to GTE Telemail.

ITT Telecom Products Corp., a division of ITT Telecommunications Corp., unveiled the ITT Infostation in late 1984. The Infostation is a personal information terminal that provides electronic messaging and two-line voice/data transmission.

Davox Communications Corp. offers three cluster, multiprotocol workstations: the Series 1921, Davox 4900 and Davox 5900. The Series 1921



Managers' voice

CONTINUED FROM PAGE S8

targets the IBM 3270 market. In addition to IBM emulation, Davox also offers ASCII and DEC emulation, as well as IBM PC capabilities and IBM PC attachability.

Ambi Corp. provides the Ambiset, which features either an eight-line LCD or a full 9-in. display and an integral keyboard. Full voice capabilities are standard on the Ambiset.

Cygnet Technologies' Communications Cosystem is a computer phone with a built-in modem and 92K bytes of internal memory that connects directly to an IBM PC or compatible.

Tymshare, Inc. unveiled the Scanset XL in November 1982. In September 1984, Matra Communications, Inc. was formed to market and service the product line in the U.S. The Scanset series of data base access terminals is designed primarily to access data via single- or dual-button operation.

Zaisan, Inc. announced its ES.1 in November 1983 and its software-enhanced version, the ES.2, in July 1985. The ES.3 model, announced in August 1984, was the first integrated voice/data terminal with IBM-compatible local processing.

Liberty Electronics USA, Inc. introduced the Freedom 212 and Freedom 222 Remote Information Stations in June 1984. These units are the company's basic display terminals with an integral 1,200 bit/sec. modem.

Compaq Telecommunications Corp. announced the Telecompaq family of integrated terminals in March 1985. A unique feature of this family is its ability to interface six standard electromechanical telephone lines — five lines plus a hold line.

C. Itoh Communication Systems, Inc. recently introduced Executive/Secretary Communication System (Escom) as a new Centrex add-on. Escom enhances a company's current Centrex system with integrated voice/data capabilities.

Panasonic Industrial Co.'s KX-D4985 Infocenter was introduced last April. In addition to two telephone lines, a diskette drive is also included with the system. The KX-D4985 allows local storage of ASCII text information formatted under the Microsoft Corp. MS-DOS protocol and has a full 128-character ASCII keyboard.

Telex Computer Products, Inc. unveiled the C078 Combined Function Terminal in November 1986. It is the only integrated terminal that is plug-compatible with the IBM 3270 system. The C078 also supports ASCII communications, DEC VT220 emulation and up to seven user-defined windows.

CONTINUED FROM PAGE S7

1984, ITT Courier introduced the ITT 9000 series of 3270-compatible products. The company expanded into plug-compatibility in February 1985 with the introduction of the ITT 1778.

This 3270 plug-compatible display terminal is compatible with the IBM 3178 and 3278 displays. The ITT 1778 is designed to attach to an IBM 3274 or 3276 controller. All other ITT terminals attach to ITT Series 9000 controllers. The ITT 1778 joins the ITT 170 and ITT 1900 as an entry-level member of the ITT 9000 series display family.

The ITT 1700 display terminal is functionally equivalent to the IBM 3178. It features a 12-in. monochrome display screen with a 1,920-char. capacity. The ITT 1900 color terminal is functionally equivalent to the IBM 3179 color station. This terminal displays seven colors on a 14-in. display screen.

ITT offers three Basic Function Display Terminals. The first two, the ITT 9210 and ITT 9212, are functionally equivalent to the IBM 3178 and are equipped with a 14-in. display screen.

The third member of the Basic Function Display Terminals is the ITT 9216. This IBM 3179 equivalent is a color terminal that offers the seven basic terminal colors. It features a 14-in. display screen with a 1,920-char. capacity.

There are also three Extended Function Display Terminals featured as part of ITT's 9000 series. The ITT 9230 and ITT 9232 are functionally equivalent to the IBM 3180 Model 1 and 3278 Models 2 through 5 display stations.

Both terminals are equipped with a 15-in. display screen and four user-selectable screen sizes. Characters are displayed in green phosphor on the ITT 9230 and in amber phosphor on the ITT 9232.

The ITT 9236 Extended Function Color Display Terminal is the functional equivalent to the IBM 3279 color display station. Seven colors are displayed on the terminal's 14-in. display screen that offers two user-selectable screen sizes.

Major contender: Lee Data

Lee Data is another major contender in the market for 3270-compatible equipment. Since its formation in 1979, the company has risen to compete as one of the top five independent vendors in this lucrative terminal area with the Series 300 and Series 4BB Display Systems.

Although it stands as a relative newcomer to the IBM 3270-compatible terminal market, Lee Data has carved out a significant market share and a high degree of user acceptance.

Since its entrance into the 3270 field, Lee Data has been an innovator, integrating multifunctional capabilities into its terminal systems.

Its Series 400 offers 3270 and asynchronous communications, dual-host capability on a single control unit and an IBM 3270-PC emulator. Products such as these give Lee Data the first truly multifunctional product line in the 3270 world.

Among the many components of the Lee Data Series 300 and Series 400 are three display terminals. The Model 1214 is an entry level unit that features a 14-in. tilt/swivel display screen. It attaches to the Series 300 and Series 4B0 controllers in 3270 mode operation only.

The Model 1222 Open Window Display Terminal combines four selectable screen sizes with window capabilities. Up to four windows can be displayed simultaneously on the 15-in. tilt/swivel display screen. The Model 1222 provides emulation of the IBM 3180.

The Model 2131 Open Window color terminal emulates the IBM 3279 Model S3G and is compatible with the IBM 3179. This model includes a 14-in. tilt-and-swivel display screen with eight-color capability. Up to four windows can be displayed simultaneously, representing four interactive sessions.

Reformed AT&T

The AT&T divestiture and deregulation have changed the way AT&T does business. The Teletype Division, once responsible for manufacturing and supplying computer display terminals and printers to the Bell operating companies, has been absorbed into the Computer Systems Division of AT&T Information Systems.

Recently, AT&T dropped all reference to its individual subdivisions and now prefers to be known simply as AT&T.

AT&T's products gained a reputation for functionality and reliability as well as for rather high price tags. However, due primarily to deregulation, AT&T terminal prices have fallen to reflect the more competitive market in which the company finds itself.

AT&T offers the AT&T E4540 series display terminals, which replace the older Teletype 4540 series and the AT&T 6500 Multifunction Communication System. Both of these feature 3270-compatible replacement products, none of which are plug-compatible.

The E4540 series is AT&T's third generation of 3270-compatible display terminal products. Among its components are four display terminals. The E4548-12 is a 12-in. monochrome display that is compatible with the IBM 3178 and 3278 Model 12.

The second terminal in this series is the E4548-25, also a monochrome display terminal. It is compatible with the IBM 3278 Model 5 and includes a 13-in. display screen with two user-selectable screen sizes. The E4549-42 offers four-color display on a 13-in. screen. It is functionally compatible with the IBM 3279 Model S2A.

DUE primarily to deregulation, AT&T terminal prices have fallen to reflect the more competitive market in which the company finds itself.

The last of the terminals in this series is the E4549-43. This model provides the user with the same features as the E4548-25 with the addition of four-color display.

In November 1985, AT&T introduced the multiple-host 6500 Multifunction Communication System, a family of products that provides compatibility with both a synchronous host and an asynchronous host.

The 6500 family can communicate with a variety of host computers, including the IBM 360, 370, 3030, 3080 and 4300 series and IBM plug-compatible mainframes from various vendors.

Asynchronous hosts such as the AT&T 3B family and the DEC VAX series can also be accessed.

AT&T's alternative to the IBM 3179 display station is the 6529 Standard Display. This unit features four- to seven-color display capability on a 14-in. screen and also offers four user-selectable screen sizes. The 6529 is functionally compatible with IBM in synchronous mode and with the DEC VT200 in asynchronous mode.

Two multitasking displays are offered as part of this system. The 6538 is a 15-in. monochrome display with four user-selectable screen sizes. It provides up to four multitasking windows in any combination of synchronous and asynchronous sessions. The 6538 is functionally compatible with the IBM 3180 in synchronous mode and with the DEC VT220 in asynchronous mode.

The second multitasking display is the 6539 color display, which also features up to four multitasking windows in any combination of synchronous and asynchronous sessions on a 14-in. display screen. Display capability of four or seven colors is provided.

Four screen formats are available, including 3270 operation, VT220 operation, full extended attributing and input and edit. The 6539 is functionally compatible with the IBM 3279-S3G in synchronous mode and with the VT220 in asynchronous mode. All of the above terminals can be connected only to the 6544 controller.

The 6528, 6538 and 6539 displays are modularly designed and can be upgraded or downgraded by switching logic bases and display monitors.

No. 5: Memorex

Memorex, a subsidiary of Unisys — the partnership of former Burroughs Corp. and Sperry Corp. — ranks fifth among the independent suppliers of 3270-compatible vendors.

Like Telex, Memorex products are plug-compatible with IBM rather than functionally compatible as are Lee Data and AT&T. This allows Memorex products to be sold into IBM shops without making a company's investment obsolete.

Memorex entered the IBM plug-compatible market in 1976 with the introduction of the 1370 series product line, replacements for the first-generation IBM components.

Five display stations are currently provided as part of the Memorex 3270 Plug-Compatible Display System. Each attaches to the Memorex 2174-8, 2274 series and 2076 Cluster Controllers, as well as to the IBM 3274 and 3276 series.

The 2078 Display Station is an alternative to the IBM 3278. It is available in four models, all of which include a 15-in. tilt/swivel display screen.

The 2079 Color Display Station provides seven-color display capability on a 14-in. monitor. The 2079, a replacement for IBM's 3279 color display, features a graphics option and is available in two models, providing either 1,920- or 2,560-char. display capacity. It combines all the features of the 2078, including four display capacities, into one model that allows the user to select screen formats and operate control settings through the keyboard.

Memorex's counterpart to the IBM 3178 is the 2178 Display Station. It features a 12-in. monitor that displays characters in green or amber phosphor.

A replacement for the IBM 3179 or 3279 is Memorex's 2179 Color Display Station. This unit combines modular design with seven-color display capability and includes a 14-in. removable tilt-and-swivel monitor.

There is no indication that this onslaught of products and features will abate anytime soon. As vendors continue to squeeze more features and functions into less and less expensive products, users will continue to reap the results of this competition — more capability for less money.

Display Terminals

COMPANY	PRODUCT	COMPATIBILITY (EMULATION MODE)	DISPLAY CAPACITY (NUMBER OF CHARACTERS/PAGE)	MEMORY CAPACITY (NUMBER OF PAGES)	SCREEN AREA (DIAGONAL INCHES)	COLOR OR MONOCHROME	SPLIT SCREEN/ WINDOWS	PROGRAM FUNCTION KEYS	TRANSMISSION MODE	TRANSMISSION (ASYNCHRONOUS/ SYNCHRONOUS)	CODE	BIT/SEC. RATE	FORMAT	PRICE	READER SERVICE NUMBER
Altos Computer Systems, Inc. 2641 Orchard Pkwy. San Jose, Calif. 95134 (408) 946-6700	Altos III	Televideo	3,432	NA	14	Mono	NA	16	Full	A	ANSI	110-19.2K	Block	$795	500
	Altos IV	Televideo, ADDS Viewpoint	2,080	NA	14	Mono	NA	16	Full	A	ASCII	110-19.2K	Block	$495	
Ampex Corp. 200 N. Nash St. El Segundo, Calif. 90245 (213) 640-0150	Ampex 210 Plus	ADDS Regent, Viewpoint	3,168	1	14	Mono	NA	14	Full, half	A	ASCII	19.2K	Block, line	$419	501
	Ampex 230 Plus	ADDS Viewpoint, Televideo, Wyse	3,168	4	14	Mono	NA	16	Full, Half	A	ASCII	38.4K	Block	$519	
	Ampex 220	DEC VT220, VT100/102, VT52	3,168	1 standard (3 optional)	14	Mono	NA	15	Full	A	ANSI	50-19.2K	Block	$529	
	Ampex 232	Televideo	3,300	1	14	Mono	NA	10	Full, half	A	ASCII	50-38.4K	Block	$499	
Ann Arbor Terminals, Inc. 6175 Jackson Road Ann Arbor, Mich. 48103 (313) 663-8000	Ambassador	DEC VT52, VT100	4,800	2	15	Mono	3	111	Full, half	A	ANSI	110-19.2K	User-defined	$1,595	502
Applied Digital Data Systems, Inc. 100 Marcus Blvd. Hauppauge, N.Y. 11787 (516) 231-5400	ADDS1010	ADDS Viewpoint	2,000	1	14	Mono	NA	6	Full, half	A	ASCII	19.2K	Character	$395	503
	ADDS2020	Wyse, Televideo	3,432	1 standard (2 optional)	14	Mono	1	16	Full, half	A	ASCII	38.4K	Character, block	$695	
	ADDS3220	DEC VT220, VT100, VT52	3,168	1	14	Mono	1	22	Full, half	A	ANSI	19.2K	Character	$695	
AT&T 15 Speedwell Ave. Morristown, N.J. 07960 (201) 221-8851	615	Any Unix environment	NA	NA	14	Mono	NA	8	Full	A	NA	NA	NA	$615	504
	620	Any Unix environment	NA	NA	14	Mono	NA	8	Full	A	NA	NA	NA	$1,295	
	510A	NA	NA	1	9	Mono	NA	8	Full, half	A	NA	NA	NA	$1,095	
	510D	NA	NA	2	9	Mono	NA	8	Full, half	A	NA	NA	NA	$1,795	
Beehive International 4910 Amelia Earhart Drive Salt Lake City, Utah 84125 (801) 355-6000	ATL-179	IBM 3270, 3179	1,920	1	14	8	NA	24	Half	A	EBCDIC	2.4M	Character	$1,895	505
	ATL-180	IBM 3180	3,564	NA	14	Mono	NA	24	Half	A	EBCDIC	2.4M	Character	$1,695	
	ATL-191	IBM 3191	1,920	1	14	Mono	NA	24	Half	A	EBCDIC	2.4M	Character	$1,149	
Cecorp 3189-E Airway Ave. Costa Mesa, Calif. 92626 (714) 754-0521	CE 1	NCR	3,300	2	14	Mono	NA	14	Full, half	A	ASCII	19.2K	Character, line, block	$329	506
	CE 3	NCR	3,300	2	14	Mono	NA	61	Full, half	A	ASCII	19.2K	Character, line, block	$600	
Chi Corp. 26055 Emery Road Cleveland, Ohio 44128 (216) 831-2622	Chi MP-1	IBM 3270	3,168	2	14	Mono	1	32	Full	S/A	ASCII	50-19.2K	Block	$1,125	507
CIE Terminals, Inc. 2505 McCabe Way Irvine, Calif. 92714 (714) 660-1421	7102 series	DEC VT100	3,168	NA	14	2	3	24	Full	A	ANSI	NA	Character	$645	508
	7103 series	ANSI X3.64	3,168	NA	14	2	3	80	Full	A	ANSI	NA	Character	$645	
	CIT 224	DEC VT220	3,432	1	14	3	NA	32	Full, half	A	ANSI	19.2K	Line, character	$749	
	CIT101XL	DEC VT100	3,168	4	14	3	NA	36	Full, half	A	ANSI	38.4K	Line, character	$699	
	CIT50+	Wyse, DEC VT100, Televideo	3,168	1	14	3	NA	36	Full, half	A	ANSI/ ASCII	38.4K	Line, character	$649	
Comterm, Inc. 110, boul Hymus, Pte. Claire Quebec, Canada H9R 1E8 (514) 694-4332	Comterm 6180	IBM 3278, 3180	3,564	2	15	7	NA	24	NA	S	EBCDIC	19.2K	Character, block	$2,325 (Canadian)	509
	Comterm 6191	IBM 3191, 3278, 3178	3,440	1	14	Mono	NA	24	NA	S	EBCDIC	19.2K	Character, block	$1,500 (Canadian)	

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.
Research assistance was provided by Datapro Research Corp.
CW chart compiled by Linda Gorgone.

COMPANY	PRODUCT	COMPATIBILITY (EMULATION MODE)	DISPLAY CAPACITY (NUMBER OF CHARACTERS/PAGE)	MEMORY CAPACITY (NUMBER OF PAGES)	SCREEN AREA (DIAGONAL INCHES)	COLOR OR MONOCHROME	SPLIT SCREEN/ WINDOWS	PROGRAM FUNCTION KEYS	TRANSMISSION MODE	TRANSMISSION (ASYNCHRONOUS/ SYNCHRONOUS)	CODE	BIT/SEC. RATE	FORMAT	PRICE	READER SERVICE NUMBER
Data General Corp. 4400 Computer Drive Westboro, Mass. 01580 (617) 366-8911	Dasher D214 Display Terminal	Data General	1,920	1	12	Mono	24	19	Full	A	ASCII	19.2K	Character	$795	510
	Dasher D411 Display Terminal	Data General	1,944	1	12	Mono	24	19	Full	A	ASCII	19.2K	Character	$1,195	
Datamaxx USA Corp. 1815 S. Gadsden St. Tallahassee, Fla. 32301 (904) 224-8213	DMX 1100	Burroughs, NCR	3,168	2	14	Mono	4	20	Full	S/A	ASCII	Up to 19.2K	Character, block	$1,195	511
	EXT 1200	Burroughs; NCR; DEC VT52, VT100	3,168	4	14	Mono	4	40	Full	A/S	ASCII	38.4K	Character, block	$1,695	
Datamedia Corp. 11 Trafalgar Square Nashua, N.H. 03063 (603) 886-1570	Colorscan 90	ADDS Request, Lear Siegler	3,168	1	12	8	8	18	Full, half	A	ASCII	19.2K	Character	$1,850	512
	Elite 90	ADDS Regent, Lear Siegler	3,168	1	14	Mono	8	18	Full, half	A	ASCII	19.2K	Character	$925	
	Elite 60	DEC VT100, VT131; ANSI X3.64	3,168	1	14	Mono	NA	15	Full, half	A	ASCII	19.2K	Character	$950	
Datapoint Corp. 9725 Datapoint Drive San Antonio, Texas 78284 (512) 699-7000	8242	Datapoint	1,920	2	14	Mono	8	10	Full	A	ASCII	50-19.2K	Character	$1,095	513
	7350	Datapoint	1,920	2	14	Mono	8	16	Full	A	ASCII	19.2K	Character	$1,495	
Davox Corp. 4 Federal St. Billerica, Mass. 01821 (617) 667-4455	4900	IBM 3270; DEC VT220, VT100, VT52	1,920	NA	12	Mono	64	16	Full	A/S	ASCII	400K	Character	$2,695	514
	5900	IBM 3270; DEC VT220, VT100, VT52	1,920	NA	12	4 standard (7 optional)	64	16	Full	A/S	ASCII, EBCDIC	400K	Character	$2,995	
Digital Equipment Corp. 200 Baker Ave. West Concord, Mass. 01742 (617) 264-1420	VT220	DEC	768	1	12	Mono	NA	15-30	Full	A	ASCII	19.2K	Character	$795	515
	VT240, VT241	DEC	768	1	12-13	Up to 4	NA	15-30	Full	A	ASCII	19.2K	Character	$2,195-$3,195	
Direct, Inc. 460 Also Ave. Santa Clara, Calif. 95054 (408) 980-1414	Direct 831	DEC VT100, VT52	3,168	NA	12	2 (optional)	NA	8	Full (half optional)	A	ANSI	NA	Character, block	$1,195	516
Esprit Systems, Inc. 100 Marcus Drive Melville, N.Y. 11747 (516) 293-5600	ESP 6310	Televideo, ADDS Regent	1,920	1 (4 optional)	14	Mono	NA	11	NA	A	ASCII	19.2K	Character, line, block	$695	517
	Opus 2	Televideo, ADDS Viewpoint	3,168	2 (4 optional)	14	Mono	2	16	NA	A	ASCII	38.4K	NA	$549	
Falco Data Products, Inc. 1294 Hammerwood Road Sunnyvale, Calif. 94086 (408) 745-7123	Falco 500	Televideo, Wyse, ADDS Viewpoint	5,808	2 (2 optional)	14	NA	6	16	Full, half	A	ASCII	38.4K	Character, block	$795	518
	Falco 5220, 5500	IBM 3101; Wyse; DEC VT220, VT100, VT52; Televideo	5,808	2 (2 optional)	14	NA	2	16	Full, half	A	ASCII	38.4K	Character, block	$495-$595	
General Business Technology, Inc. 1891 McGaw Ave. Irvine, Calif. 92714 (714) 261-1891	7700DS	IBM 5251	1,920	NA	14	1 (1 optional)	NA	0	Twinax	Twinax	EBCDIC	600-9.6K	Character	$1,450	519
	7710DS	IBM 3179-2	1,920	NA	14	Mono	NA	24	Twinax	Twinax	EBCDIC	NA	Character	$1,550	
G.R. Electronics 1640 5th St. Santa Monica, Calif. 90401 (213) 395-4775	Oyster	DEC VT100	1,280	1½	9½	LCD display	NA	4	Full, half	S/A	ASCII	19.2	Character, line, block	$995	520
Harris Corp. 16001 Dallas Pkwy. Dallas, Texas 75240 (214) 386-2000	H179, H181	IBM 3179, 3180	1,920-3,554	NA	14	7	None	24	NA	S	EBCDIC	NA	Line	$1,895-$2,095	521
Honeywell Information Systems, Inc. 3 Newton Executive Park Newton Lower Falls, Mass. 02162 (617) 969-0250	HDS7	Honeywell	3,300	NA	14	Mono	5	12	Half	S/A	ASCII, ANSI	9.6K	Character, block	$1,200	522
	HDS1	ADDS Viewpoint, Wyse, Televideo	2,000	NA	14	Mono	NA	10	Half	A	ASCII	19.2K	Character	$525	
	HDS3	DEC VT220, VT100, VT52	3,300	NA	14	Mono	NA	14	Half	A	ANSI	19.2K	Character	$750	
Human Designed Systems, Inc. 3440 Market St. Philadelphia, Pa. 19104 (215) 382-5000	HDS2200	DEC VT220	3,300	4	15	Mono	4	45	Full, half	A	ANSI	19.2K	Character, line, block	$795	523

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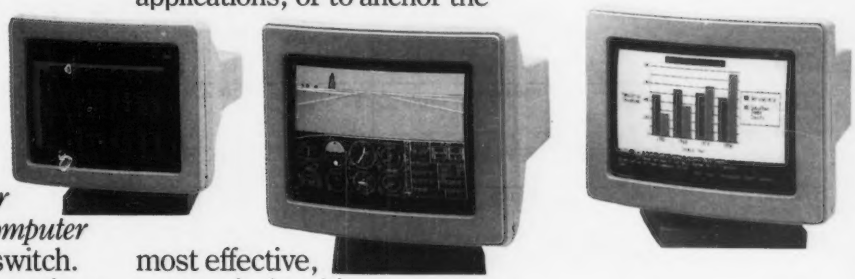

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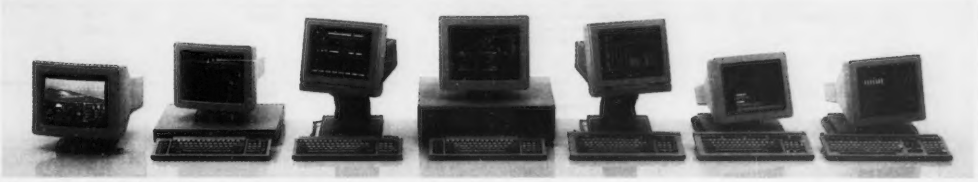

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DIAL-INQ READER SERVICE NUMBER 3

COMPANY	PRODUCT	COMPATIBILITY (EMULATION MODE)	DISPLAY CAPACITY (NUMBER OF CHARACTERS/PAGE)	MEMORY CAPACITY (NUMBER OF PAGES)	SCREEN AREA (DIAGONAL INCHES)	COLOR OR MONOCHROME	SPLIT SCREEN/ WINDOWS	PROGRAM FUNCTION KEYS	TRANSMISSION MODE	TRANSMISSION (ASYNCHRONOUS/ SYNCHRONOUS)	CODE	BIT/SEC. RATE	FORMAT	PRICE	READER SERVICE NUMBER
	HDS2200G	Tektronix 4014, Visual 500	3,300	4	15	Mono	4	45	Full, half	A	ANSI	19.2K	Character, line, block	$1,295	
	HDS2200GX	Tektronix 4014, Visual 500	3300	6	15	Mono	4	45	Full, half	A	ANSI	19.2K	Character, line, block	$1,595	
IBM Old Armonk Road Armonk, N.Y. 10504 (914) 765-1900	3101, 3161,3162, 3163	DEC VT100, ADDS, Lear Siegler, Televideo	1,920	1	12	Mono	NA	24	Full, half	A	ASCII	19.2K	Block	$1,595	524
	3164	DEC VT100 family, ADDS, Lear Siegler, Televideo	1,920	1	14	Color	NA	24	Full, half	A	ASCII	19.2K	Character, block	NA	
	3194	NA	1,920	NA	14	Color	2	24	Full, half	S	EBCDIC	NA	Character, block	$2,895	
	3196	NA	1,920	NA	12	Mono	0	24	Full, half	S	EBCDIC	NA	Character, block	$1.295	
Informer Computer Terminals, Inc. 22936 Mill Creek Road Laguna Hills, Calif. 92653 (714) 855-3112	200-207	IBM 3101, 3178, 3276, 3278, 5251; DEC VT100, VT102	2,168	Unlimited	9	4	NA	24	Full, half	A/S	ANSI, ASCII	9.6K	Character	Available upon request	525
Intecolor/Datavue Corp. 225 Technology Park Norcross, Ga. 30130 (404) 449-5961	4100	Tektronix 4105	3,168	2	14	16	NA	NA	Full, half	RS-232	ANSI	38.4K	Character	$1,995	526
	CT210, CT220	DEC VT100, VT220	1,920	2	14	16	NA	24	Full, half	RS-232	ANSI	19.2K	Character	$1,295-$1,695	
ITT Courier P.O. Box 29039 Phoenix, Ariz. 85038 1 (800) 528-1400	9210	IBM 3270	1,920	NA	13	Mono, color	2	24	Full, half	S	EBCDIC	NA	Block	$1,295	527
	9230	IBM 3270	1,920, 2,560, 3,440	NA	16	Mono, color	2	24	Full, half	S	EBCDIC	NA	Block	$1,995	
Kimtron Corp. 1709 Junction Court San Jose, Calif. 95112 (408) 436-6550	KT-22/PC	DEC VT220, VT100, VT52; IBM PC XT, AT	3,300	3	14	Mono	4	15/30	Full, half	A	ANSI	38.4K	Line, character	$749	528
	KT-5	DEC VT52, ADDS Regent, Televideo	3,300	2	14	Mono	1	82	Full, half	A	ASCII, ANSI	50-19.2K	Block, line	$399	
Lanpar Technologies, Inc. 747 Main St. Concord, Mass. 01742 (617) 371-0915	Vision 3222	DEC VT220, 240	3,300	8	14	Mono	2	16	Full	A	ANSI		Character, line, block	$725	529
Lee Data Corp. 7075 Flying Cloud Drive Eden Prairie, Minn. 55344 (612) 828-0300	Model 1222	IBM 3278; DEC VT100, VT132; Hewlett-Packard; Televideo	3,564	1	15	Mono	6	24	Full, half	A/S	ASCII, EBCDIC	9.6K	Character, line, block	$1,900-$2,500	530
	Model 2131	IBM 3270; DEC VT100, VT132	3,564	1	15	7	6	24	Full, half	A/S	ASCII, EBCDIC	9.6K	Block, character	$2,100-$2,900	
Lee Data Corp. Phaze Terminal Division 7650 E. Redfield Road Scottsdale, Ariz. 85260 (602) 991-6855	P3278	IBM 3278, 3178	1,920	1	12	Mono	NA	24	Half	S	EBCDIC	3270 coax	NA	$1,050	531
	1178, 1179	IBM 3178, 3179, 3279	1,920	1	14	Up to 7	NA	24	Half	S	EBCDIC	3270 coax	NA	From $795	
Liberty Electronics U.S.A. 332 Harbor Way South San Francisco, Calif. 94080 (415) 742-7000	Freedom Series	Wyse; Televideo; Lear Siegler; ADDS Veiwpoint; Data General; DEC VT220, VT100, VT52	3,168	2	14	Mono	3	44	Full, half	A	ASCII, IBM PC scan codes	38.4K	Block, character, line	$449-$599	532
Link Technologies, Inc. 47339 Warm Springs Blvd. Fremont, Calif. 94539 (408) 943-0142	Link 125	Televideo; Wyse; Lear Siegler; ADDS Viewpoint	3,168	2	14	Mono	2	40	Full, half	A	ASCII	38.4K	Block, character, line	$525	533
	Link 220	DEC VT52, VT100, VT132, VT220; ANSI X3.64	3,432	2	14	Mono	2	38	Full, half	A	ANSI	38.4K	Block, character, line	$595	
	PCTerm	Wyse, Televideo	3,300	2	14	Mono	2	40	Full, half	A	ASCII, IBM PC scan codes	38.4K	Block, character, line	$649	
	MC 3	DEC VT100, Wyse, Televideo, ADDS Viewpoint	5,676	6	14	Mono	2	40	Full, half	A	ASCII, ANSI, IBM PC scan codes	38.4K	Block, character, line	$565-$675	
The Lynk Corp. 101 Queens Drive King of Prussia, Pa. 19406 (215) 265-3550	Lynk Station 912	IBM 5291, 3196	2,000	NA	15	Mono	2	22	Twinax	S	NA	3.2M	Character	Available upon request	534
	Computing Lynk	IBM 3180	3,300	NA	15	Mono	2	22	Twinax	S	NA	3.2M	Character	Available upon request	

COMPANY	PRODUCT	COMPATIBILITY (EMULATION MODE)	DISPLAY CAPACITY (NUMBER OF CHARACTERS/PAGE)	MEMORY CAPACITY (NUMBER OF PAGES)	SCREEN AREA (DIAGONAL INCHES)	COLOR OR MONOCHROME	SPLIT SCREEN/ WINDOWS	PROGRAM FUNCTION KEYS	TRANSMISSION MODE	TRANSMISSION (ASYNCHRONOUS/ SYNCHRONOUS)	CODE	BIT/SEC. RATE	FORMAT	PRICE	READER SERVICE NUMBER
McDonnell Douglas Computer Systems Co. 17481 Red Hill Ave. Irvine, Calif. 92713 (714) 250-1000	Prism 7, Prism 9	DEC VT220	3,168	1-8	14	Mono	NA	18	Full	A	ASCII, ANSI	To 19.2K	NA	$550-$750	535
Megadata Corp. 35 Orville Drive Bohemia, N.Y. 11716 (516) 589-6800	850	ANSI X3.64 (OEM interfaced)	2,000	8	15	Mono	2	Up to 100	Full, half	S/A	ASCII	To 19.2K	Menu-selectable	$2,500-$2,800	536
Memorex Corp. San Tomas at Central Expwy. Santa Clara, Calif. 95052 (408) 987-1000	2179	IBM 3179	1,920	1	14	8	NA	24	Full, half	S/A	EBCDIC	19.6K	Block	$1,995	537
	2180	IBM 3180	3,564	7	15	Mono	NA	24	Full, half	S/A	EBCDIC	19.6K	Block	$1,995	
	2180C	IBM 3180	3,440	7	14	8	NA	24	Full, half	S/A	EBCDIC	19.6K	Block	$2,195	
Micro-Term, Inc. 512 Rudder Road Fenton, Mo. 63026 (314) 343-6515	Foresight 4520, Foresight 4525	DEC VT220, VT100, VT52	3,300	2-7	14	Mono	3	15	Full, half	A	ANSI	38.4K	Character	$695-$795	538
	Foresight 4560	DEC VT220, VT100, VT52; Tektronix	3,300	7	14	Mono	3	15	Full, half	A	ANSI, ASCII	38.4K	NA	$1,295	
	Ergo 440	DEC VT240, VT220, VT100, VT52	3,300	2	14	Mono	3	15	Full, half	A	ANSI, ASCII	19.2K	NA	$1,495	
Motorola Computer Systems, Inc. 10700 N. DeAnza Blvd. Cupertino, Calif. 95014 (408) 864-4740	TM3241G	DEC VT52, VT100, VT220, VT200; Tektronix	3,696	1	14	7	NA	15	Full, half	A	ANSI	19.2K	Character	$2,295	539
	TM2201	DEC VT220	3,300	1	14	Mono	NA	15	Full, half	A	ANSI	19.2K	Character	$895	
Paradyne Corp. 8550 Ulmerton Road Largo, Fla. 33540 (813) 530-2000	7812, 7812 Enhanced	IBM 3278	1,920	NA	12	Mono	Up to 4	24	Full	S	EBCDIC	9.6K	Block	$1,300-$1,800	540
	7814	IBM 3278	3,564	NA	14	Mono	4	12	Full	S	EBCDIC	9.6K	Block	$2,400	
	7913	IBM 3279	2,560	NA	13	7	4	12	Full	S	EBCDIC	9.6K	Block	$3,100	
Plessey Peripheral Systems, Inc. 15542 Mosher Ave. Tustin, Calif. 91680 (714) 261-9945	PT100G	DEC VT100 (VT131 option)	6,336	16K standard buffer	14	Mono	2	30	Full, half	A	ASCII, ANSI	To 19.2K	NA	$1,395	541
	PT224	VT220	3,168	NA	14	Mono	NA	45	Full, half	A	ASCII, ANSI	To 19.2K	NA	$795	
Prime Computer, Inc. Prime Park Natick, Mass. 01760 (617) 655-8000	PT200	IBM 3270	3,564	2	14	Up to 7	1	26	Full, half	A	ANSI	19.2K	Character, block	$995-$1,695	542
Qume Corp. 2350 Qume Drive San Jose, Calif. 95131 (408) 942-4144	QVT100 Plus	ADDS Viewpoint, Lear Siegler, Televideo	1,920	4	14	Mono	NA	20	Full, half	A	ASCII	To 19.2K	Block, line, character	$445	543
	QVT119 Plus	ADDS Viewpoint, Wyse, IBM 3101, Televideo	3,168	4	14	Mono	1	20	Full, half	A	ASCII	To 38.4K	Block, line, character	$595	
	QVT203 Plus	DEC VT220, VT131, VT100, VT52	3,168	4	14	Mono	NA	15	Full, half	A	ANSI	To 38.4K	Block	$645	
RCA New Products Division New Holland Ave. Lancaster, Pa. 17604 (717) 295-6000	VP 5801	Televideo; DEC VT52, VT100	1,920	1	12	Mono	NA	8	Full, half	A	ASCII	9.6K direct connect	Character	$898	544
	VP 6000	Televideo; DEC VT52, VT100 subset	1,920	12.5 (29 optional)	12	Mono	1	8	Full, half	A	ASCII	9.6K direct connect	Character	$998	
	VP 7000	NAPLPS	960	1	12	16	NA	16	Full, half	A	ASCII, NAPLPS	19.2K	Character, NAPLPS	$1,250	
Tab Products Co. 1400 Page Mill Road Palo Alto, Calif. 94304 (415) 852-2400	E32	DEC VT100, VT52; Prime Computer	3,564	2 (4 option)	15	Mono	1	28	Full, half	A	ANSI, ASCII	19.2K	Character, line, block	$950	545
	E22	DEC VT220, VT100, VT52	3,564	2	15	Mono	1	45	Full	A	ANSI, ASCII	19.2K	Character	$660	
Tandem Computers, Inc. 14231 Tandem Blvd. Austin, Texas 78728 (512) 244-8000	653X	Tandem	1,920	8	9, 12, 15	Mono	NA	16	Full, half	S/A	ASCII, RS-232	19.2K	Block, line, character	$1,295-$1,695	546
	6526	Tandem; ANSI X3.64	1,920	16	14	Mono	NA	16	Full, half	A	ASCII, RS-232	19.2K	Block, line, character	$1,095	

COMPANY	PRODUCT	COMPATIBILITY (EMULATION MODE)	DISPLAY CAPACITY (NUMBER OF CHARACTERS/PAGE)	MEMORY CAPACITY (NUMBER OF PAGES)	SCREEN AREA (DIAGONAL INCHES)	COLOR OR MONOCHROME	SPLIT SCREEN/ WINDOWS	PROGRAM FUNCTION KEYS	TRANSMISSION MODE	TRANSMISSION (ASYNCHRONOUS/ SYNCHRONOUS)	CODE	BIT/SEC. RATE	FORMAT	PRICE	READER SERVICE NUMBER
Tatung Co. of America, Inc. 2850 El Presidio St. Long Beach, Calif. 90810 (213) 979-7055	TVT-7220, 7220 Plus	DEC VT220, VT100, VT52	3,168	1 (2 or 3 option)	14	Mono	NA	105	Full, half	A	ASCII	9.6K	Character, line, block	$599-$650	547
	TVT-7261	Televideo; Lear Siegler; ADDS Viewpoint; IBM 3101; Wyse; DEC VT131, VT102, VT100, VT52	3,432	1 (2 or 3 option)	14	Mono	NA	105	Full, half	A	ASCII, ANSI	9.6K	Character, line, block	$650	
Tec, Inc. 2727 N. Fairview Ave. Tucson, Ariz. 85705 (602) 792-2230	Data-PAD portable LCD terminal	RS-232	1,280	6 (option)	9	Mono	NA	10	Full, half	A	ANSI	19.2K	Block	$995	548
	Tec ET series	RS-232	2,000	2	15	Mono	2	10	Full, half	A	ANSI	19.2K	Block	$1,795	
Telegenix, Inc. 26 Olney Ave. Cherry Hill, N.J. 08034 (609) 424-5220	TDS 2000 series	ANSI X3.64	16-1,920	1	NA	Mono	Un-limited	15	Simplex	A	ASCII	9.6K	Character	$2,400-$88,000	549
Teleray, Inc. P.O. Box 24064 Minneapolis, Minn. 55424 (612) 941-3300	Model 20 series	Hewlett-Packard; DEC VT220, VT100; Honeywell	3,168	8	14	Mono	2-4	32	Full, half	A	ASCII, ANSI	19.2K	Character, line, block	$1,295	550
Televideo Systems, Inc. 1170 Morse Ave. Sunnyvale, Calif. 94086 (408) 745-7760	955	Televideo 950	3,168	4	14	Mono	NA	64	Full, half	A	ASCII	38.4K	Character, line, block	Available upon request	551
Telex Computer Products, Inc. 6422 E. 41st Tulsa, Okla. 74135 (918) 627-1111	Telex C078	IBM 3270; DEC VT220	1,920	NA	12	Mono	7	240	Full	A/S	ANSI, ASCII	9.6K	Character, line, block	$2,695	552
	Telex 180-1	IBM 3270	3,564	NA	15	Mono	NA	24	Half	S	EBCDIC	19.2K	Block	$2,095	
	Model 078-2	IBM 3196	1,920	NA	12	Mono	NA	NA	Twinax	Twinax	Twinax	Twinax	Twinax	$1,295	
Texas Instruments, Inc. P.O. Box 2909 Austin, Texas 78769 (512) 250-7111	Travelmate	DEC VT100	1,280	1	9¼	Mono	NA	4	Full, half	A	ASCII	300-1,200 (internal modem)	Character	$1,295	553
Unisys Corp. P.O. Box 500 Blue Bell, Pa. 19424 (215) 542-4011	SVT-1100	DEC VT52, VT100	1,210	NA	12	Mono	NA	NA	Full	A/S	ASCII	19.2K	Character, block	$495	554
	SVT-1220	DEC VT220	2,048	1	12	Mono	2	20	Full, half	A/S	ASCII	NA	Character, block	$895	
	ET-1100	Burroughs	2,080	10	14	Mono	2	NA	Full	A/S	ASCII	Up to 338.4K	Character, block	$1,600	
	T27	Burroughs	2,400	24	12, 15	Mono	3	NA	Full	A/S	ASCII	Up to 38.4K	Character, block	$1,400	
Visual Technology, Inc. 1703 Middlesex St. Lowell, Mass. 01851 (617) 459-4903	Visual 603	DEC VT220	6,600	1	14	Mono	2	15	Full, half	A	ANSI	38.4K	Character	$695	555
	Visual 601	Wyse 50	6,600	1	14	Mono	2	16	Full, half	A	ASCII	38.4K	Character	$695	
Wang Laboratories, Inc. 1 Industrial Ave. Lowell, Mass. 01851 (617) 967-2123	Advent	NA	1,920	NA	19	Mono, color	NA	16	NA	A/S	ASCII	4.3K	Block	$13,900	556
	4230A	Teletype, DEC VT100, IBM 3271, 3274, 2780/3780, 3777	NA	NA	12	Mono	4	16	Full	S	Wang pro-prietary	4.3K	Block	$2,300	
	2110A	DEC VT102, Wang 2110	NA	8	14	Mono	1	16	Full, half	A/S	NA	19.2K	Character	$895	
Wicat Systems, Inc. 1875 S. State St. Orem, Utah 84058 (801) 224-6400	Wicat T7100	DEC VT131, VT100, VT52; Televideo; Ampex	1,920	2	14	Mono	2	16	Full, half	A	ANSI	38.4K	Character	$795	557
Wyse Technology, Inc. 3571 N. First St. San Jose, Calif. 95143 (408) 433-1179	WY-60, WY-85	DEC VT100, VT220, VT52; ADDS Viewpoint; Televideo; Wyse; IBM PC AT	3,300-5,808	1-7	14	Mono	2-3	15-16	Full, half	A	ASCII, ANSI	38.4K	Character, line, block	$599	558
	WY-350	Wyse, ADDS Viewpoint, Televideo	3,300	1	14	64	3	16	Full, half	A	ASCII	38.4K	Character, line, block	$999	
Zentec Corp. 2400 Walsh Ave. Santa Clara, Calif. 95051 (408) 727-7662	ADM 1000	ADM, ADDS Viewpoint, Esprit	1,920	2	14	Mono	NA	7	Full, half	A	ASCII	19.2K	Character	$399	559
	ADM 12 Plus	Televideo, Esprit, ADM	3,168	2	12, 14	Mono	NA	16	Full, half	A	ASCII	19.2K	Block, line, character	$549	
	8392	Hewlett-Packard	3,168	8	14	Mono	NA	8	Full, half	A	ASCII, ANSI	19.2K	Block, line, character	$1,195	

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DIAL-INQ READER SERVICE NUMBER 1

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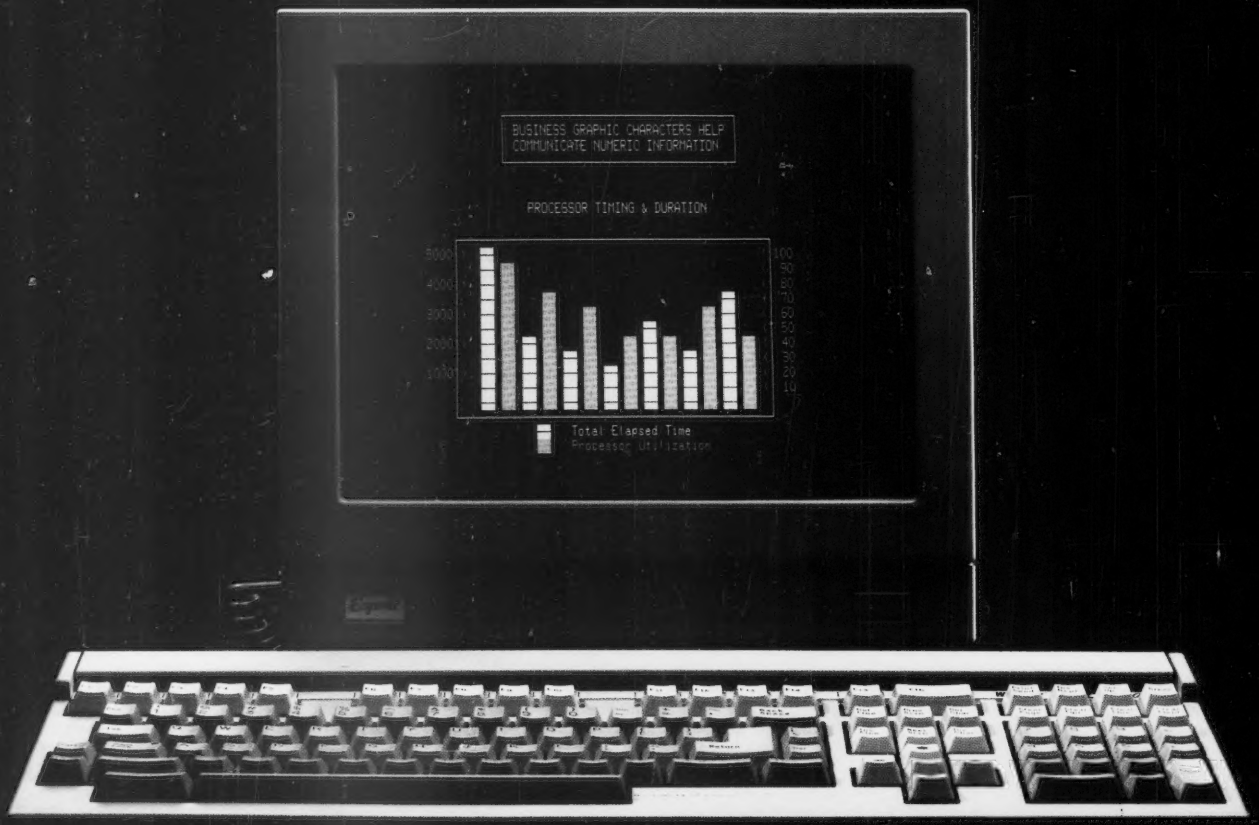

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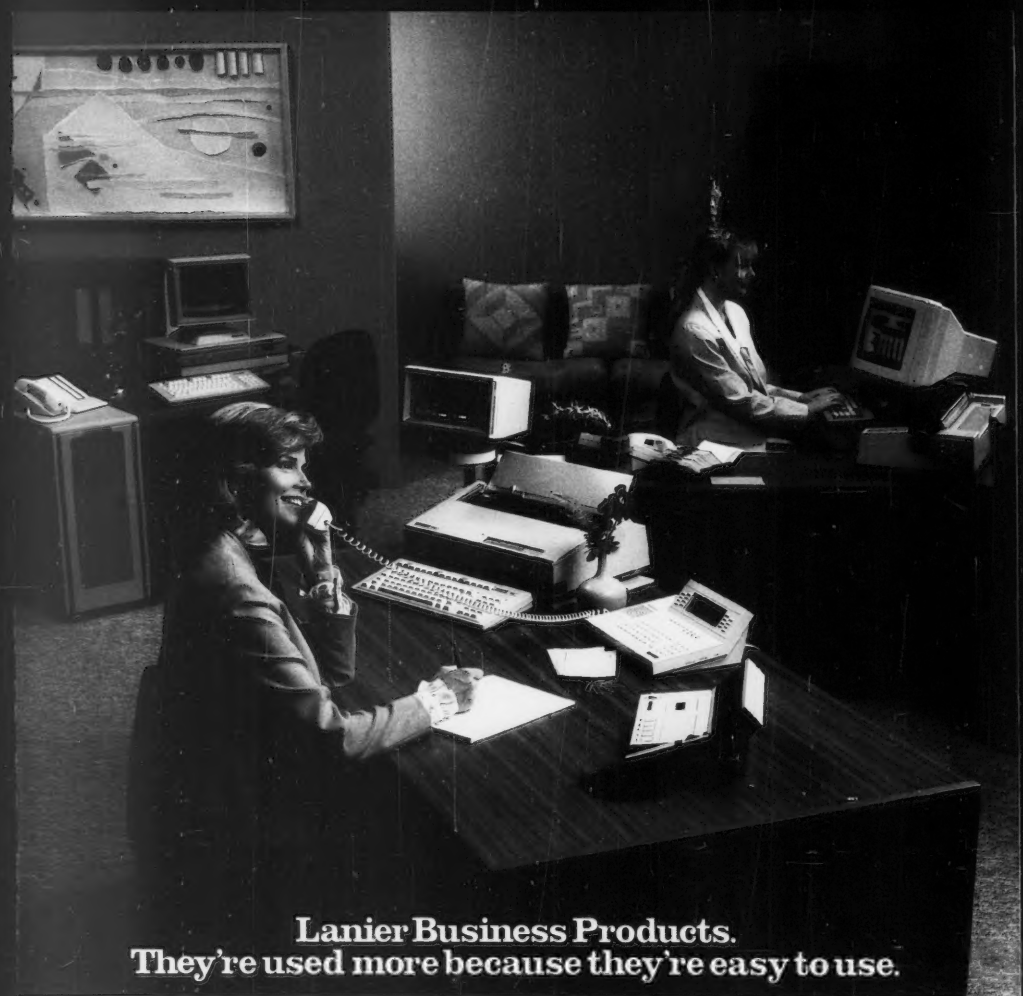

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They're used more because they're easy to use.

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How many times have you seen people sitting by their phones holding the receiver while they figure out their next move?

Lanier business telephones are designed to keep you talking. No matter what you want to do with a phone, you can do it easily and quickly with a Lanier.

Take the new Lanier EZ-Talk® telephone.

When you're ready to make a call, EZ-Talk's speed dialing can quickly access up to 300 numbers with its built-in memory. Need to confirm a date? Glance at the 60-day calendar on its screen. Your staff can even send on-screen memos with EZ-Talk.

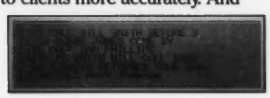
The EZ-Talk's screen can also tell you who's holding, who left messages and who needs to see you. So your most important client doesn't have to wait. You can call home immediately if you need to. And you don't have to put up with annoying buzzes and intercom interruptions.

The Lanier EZ-Talk telephone will replace your phone, phone file, and calendar!

The Lanier EZ-Talk telephone replaces your phone, your calendar and your phone file. And it's fully compatible with PBX and most key office phone systems.

There are other complete Lanier business telephone systems, too. Full-featured Lanier phones that tie into dictation and other systems. Right up to a digital PBX that can accommodate 32 trunks and 120 stations.

To go along with your phones you can also invest in a Lanier phone monitoring system to track all the calls from your office. So you can bill time and long-distance charges to clients more accurately. And



The EZ-Talk telephone's 16-line screen tells you who called, who's holding and who needs to see you.

better manage your time as well as your staff's.

WE'VE MADE DICTATING AS EASY AS TALKING.

It's a fact that you can dictate 600% faster than you can write. That is, only if you don't have to spend time figuring out how to use your dictation equipment.

With Lanier, there is nothing to it. We've made dictating simple with units available in every size and configuration you can imagine.

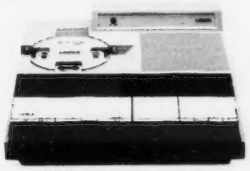
The new Lanier Pocket Protégé™ is one of the smallest microcassette units in the world. It's the only micro-

Pocket Protégé puts all the features of a desktop dictation unit in the palm of your hand.

cassette portable of any size with a display screen to tell you how many recordings are on your tape, and the length of each. So you can instantly locate any recording you want to review. Our screen also tells you if voices aren't loud enough to be recorded clearly.

Pocket Protégé lets you give your secretary special instructions before she starts typing. So she won't finish typing a lengthy letter only to find a paragraph you want inserted. So you save her time and yours.

But even though Pocket Protégé is a product of incredibly intricate technology, it's easy to use even if you're all thumbs. Just use one of them to operate the one-button that controls all the main functions: record, rewind, listen and stop.



With the Lanier Messenger four executives can have their own cassette for dictation.

Lanier dictation equipment keeps your whole office organized, too.

The Lanier Messenger,® for example. Its revolving tray of four microcassettes lets several people dictate from in the office. Or out of the office. Because with the Messenger you can phone in your dictation. You can assign the microcassettes according to department, type of task or priority.

The Lanier VoiceWriter® System is for offices with heavier work loads. It lets several people record and transcribe at once. It can receive dictation from right there in the office, or over the phone, even from continents away.

And VoiceWriter lets you add to recordings exactly where you want the additional text. When you dictate your addition, the system inserts it right where you want it by "moving over" all the text that follows. You don't have to worry about erasing the original recording.

The VoiceWriter System has a console that tells you the status of each piece of dictation. So if you need a recording transcribed right away, it can be found right away. No one has to spend endless hours plowing through tapes to find it.

IT'S EASY TO SEE WHY THE NEW LANIER VIEWWRITER™ SHOULD REPLACE YOUR TYPEWRITERS.

ViewWriter is the only real electronic display typewriter. Its 16-line screen lets typists delete and rearrange entire paragraphs with a few simple keystrokes.

They can work faster with ViewWriter's lift-off correction, which is easier to use than other typewriters'. It can correct anywhere on the page, two or twenty lines later.

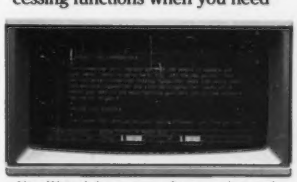
Storing what's been typed has never been easier, either. ViewWriter has its own memory and expandable storage.

In fact, ViewWriter has all the features of the best electrics and electronics, with many of the time-saving word processing features the

Easy-to-use ViewWriter is the typewriter that can insert or delete words and paragraphs in seconds.

best computers have. Like word wrap-around. And inserting and deleting words, or even paragraphs, is a breeze. There's no more need for retyping an entire text.

ViewWriter's a typewriter when you need it to be, and has word processing functions when you need



ViewWriter's large screen lets you view and edit 16 lines of text.

them. Yet, for all its versatility, it's so easy, your people can learn to use it in less than an hour. So they can be typing away on the very first day. Before lunch.

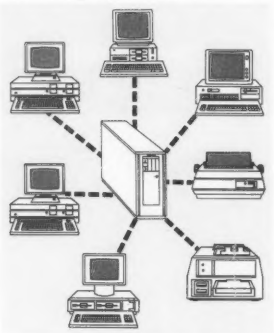
AT LAST. A FULLY-INTEGRATED COMPUTER NETWORK THAT'S EASY TO USE.

Until now, there's been only one way to make different kinds of PC's work together. With a network that required people to learn a lot of complicated computer network commands.

But now, there's the Lanier network. The first network that lets you tie all your IBM-compatible PC's, printers, and disk drives together, and use them with just a few simple commands. It even tells you what commands to use.

The Lanier network makes your PC's a lot more productive. And therefore something even more valuable becomes more productive. Your people.

Our network also saves you money on printers and other peripherals, since everyone can share.



With the new Lanier network, you don't have to learn complicated computer commands to make all your PC's work together.

The Lanier network makes others obsolete because it's so easy to use. And because it's so easy to learn to use with the Lanier Support Staff. They'll have your office completely operational in far less time than it would be with any other network.

WE MAKE THINGS SO EASY, IT'S EASY TO SAY YES.

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In Depth

Intrapreneurship: Turning in-house projects to profit

There's a ready market for your proven software • Best bets: Critical applications and heavy volumes • Four reasons to sell to your competitors

By RICHARD RAYSMAN and PETER BROWN

A mid-size radio station spent four years developing and implementing a software package that performed all of the station's accounting and billing functions, calculated its reach and frequency analysis for sales presentations to advertisers and analyzed its penetration into the radio-listening marketplace. The station's MIS department spent $300,000 to develop the system and was able to show increased savings of $125,000 during the first year of implementation.

During the third year of implementation, the station marketed the software system to eight other radio stations; this effort showed a $200,000 profit. This year, the station expects to have another 20 software customers.

Most companies overlook the potential profitability within their own MIS departments. These departments maintain specialized software products that take several years and large cash investments to develop. Once these products have been generalized for other applications, they can be licensed to firms that need proven, sophisticated software systems. The best of these products have proven themselves to be an integral and valuable part of a company's business.

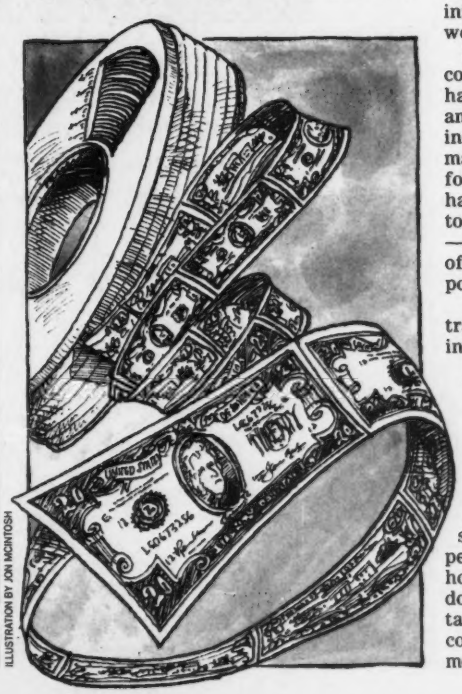

ILLUSTRATION BY JON MCINTOSH

With proper planning and a well-executed marketing effort, the "intrapreneurial," or in-house, venture can create additional useful products and become a dynamic profit center. But since software companies derive almost all of their value from the intellectual property in their software products, intrapreneurs must take unique precautions to protect these assets. These defenses must be in place well before the first software product is licensed to an end user.

The company considering an intrapreneurial venture must also weigh the strategic worth of its product, judging whether the product can be made available for public use without damaging the corporate competitive edge.

New opportunities

For companies searching for new businesses and new products, software is an ideal product to consider. In most large organizations, the data processing function is well funded and populated with highly skilled technical personnel. These technical workers are, for the most part, self-motivated, creative and innovative. In addition, the product's research and development expenses have been accounted for in its initial development, so start-up costs are well in hand.

Some pioneering companies that have committed to intrapreneurial ventures have found exciting opportunities. For example, a large international brokerage and investment banking firm recently began to market a comprehensive software product for brokerage applications. This product handles on-line applications — such as customer order entry and into-account inquiry — as well as back-office functions like end-of-day batch processing and detailed reports of the previous day's activities.

The brokerage firm is a leader in the trading of stocks and bonds and raising investment capital in the financial markets. Yet until recently, it was not in the business of licensing software products. However, top management's historical willingness to support intrapreneurial ventures was a factor in the brokerage firm's decision to enter an entirely new business.

A sophisticated brokerage processing software system was developed during a period of years for the brokerage firm's in-house data processing facilities. Millions of dollars in employee compensation, consultants' fees and leading-edge equipment costs were spent on the system's development. The end result was a sophisticated,

About the authors

Raysman and Brown are partners in the New York law firm Brown, Raysman & Millstein, specializing in computer law. They are co-authors of "Computer Law: Drafting and Negotiating Forms and Agreements," published by the Law Journal Seminars-Press.

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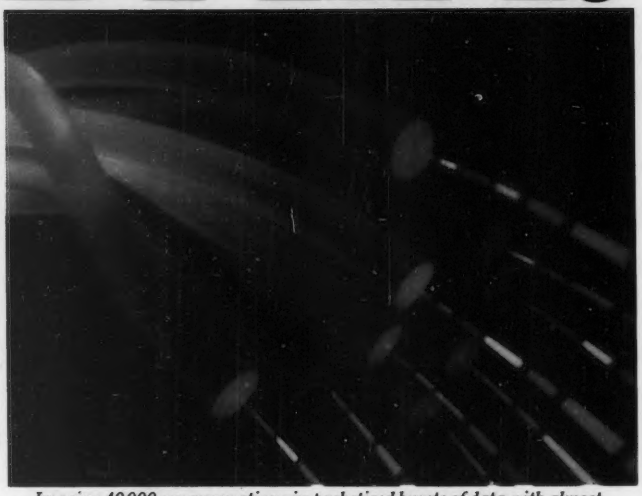

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comprehensive brokerage software system that was better than virtually any other system being used by major brokerage companies.

The brokerage firm had made a significant financial commitment to the development of a first-rate automated system, and a readily identifiable market of other brokerage firms was available.

In addition, with the deregulation of the banking industry, many larger banks were interested in a sophisticated automation of their brokerage functions.

The firm's senior management, in conjunction with its MIS director, identified this new software product as a potential profit center. To implement its plans, the brokerage firm kept in place the technical staff that was instrumental in developing the automated system, and it recruited experienced management and marketing talent.

A new corporate subsidiary was formed to market the system. The subsidiary was assured a strong start by adequate financing and a superior management team.

> ***Once software is generalized for use by others, it is potentially the core of a new business venture.***

The subsidiary currently markets the brokerage software system for $1,000,000 or more per license. This product is a proven one that works successfully; the new subsidiary can use the brokerage firm as a built-in reference. By supporting its staff and its internally developed products, the firm was able to launch a successful new business using existing resources.

Capitalizing on experience

In another example, a major international telecommunications company entered the stock transfer business. Stock transfer services are highly complex record-keeping functions that track buying and selling of stock, dividend reinvestment, stock splits and related transactions. The company was large enough to perform transfer services for itself and its subsidiaries.

To perform these services, the company had created a separate subsidiary. The stock transfer subsidiary acquired three large mainframes and employed more than 1,000 workers to program the computers and perform back-office functions. Since computer backup was crucial, one of the three mainframes was used almost solely for this purpose and often stood idle.

With the deregulation of the telecommunications industry, the company's management wanted to invest in new businesses and identified stock transfer services as an ideal new venture. Although the company had never before been in the stock transfer business, it was familiar with the necessary elements:

- It had been providing these services to its own shareholders for many years.
- It had made the investment in software.
- It had a large and highly sophisticated technical staff to improve and maintain this investment.

Management decided to capitalize on the company's experience by marketing the transfer services to banks, Fortune 500 companies and other large financial institutions. Instead of recruiting outside management talent as the brokerage firm had, the company decided to use its own personnel. Instead of forming an entirely new subsidiary, an additional division within the existing subsidiary was formed to support the stock transfer venture.

Since the telecommunications company had never before been in the business of marketing a software product, it retained outside marketing, financial and legal consultants to advise on the best way to pursue the stock transfer market. As in any new venture, the company's management had to work hard to assemble top-quality technical and marketing personnel. After normal start-up delays and a massive financial investment, the stock transfer subsidiary successfully launched a profitable new business using its existing software and staff.

The core of a new venture

Often, a large enterprise such as a bank, insurance company or manufacturing firm has spent millions of dollars to develop a sophisticated software system for its specific needs. However, the software can be modified to be generally applicable to other organizations with similar business needs. Once this software is generalized for use by others, it is potentially the core of a new business venture.

Large aircraft manufacturers, for example, have taken advantage of their software and hardware capacities for some time. These manufacturers have found it necessary to install expensive and sophisticated DP facilities.

In order to utilize excess DP capacities and their sophisticated in-house talent, some of these manufacturers have started lucrative computer service bureau operations. For example, Boeing Corp. has built Boeing Computer Services Co. into one of the most successful computer service bureaus in the U.S.; McDonnell Douglas Corp. has started the McDonnell Douglas Automation Co., often referred to as McAuto; and Grumman Corp. has created Grumman Data Systems Division. These intrapreneurial ventures were started well before intrapreneurial

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ventures came into vogue.

Software provides those companies that have already developed a working in-house system with an ideal medium for a new venture. A ready market is available for proven software products that work and have been used in the operation of a business.

The initial investment in software for new applications can be very large and unfortunately often results in software that does not work properly. It is often more economical for a company to acquire software by licensing an existing software product that works rather than attempting to develop its own.

Identifying the product

Several criteria should be applied to identify a product that might succeed as a new venture.

Major in-house software venture. The software product should originally have been a major financial and technical undertaking within the company itself. During the product's development and implementation, sufficient resources should have been devoted to the software product with the result that it would be sufficiently differentiated from other, potentially competitive software products.

Within any large organization, probably not more than a few software products can be classified as major development efforts. Additional technical development work would have to be performed on these software products to make them more generally usable by a broader range of companies.

Large volume of transactions. The software product should be used within the company's organization to process a large volume of transactions for the company.

If the product successfully handles a heavy load, a higher licensing fee in the marketplace is justified, resulting in a more profitable product.

Critical application. The software product should handle a vital function within the company. If the application is critical to the company, it will also be a critical application for the potential customers.

An organization is usually inclined to pay a higher license fee for software that can improve its vital functions than for a product that is more a luxury than a necessity.

In the brokerage company example, the software product was the lifeblood of the business. As a licensed software product, it would also become the lifeblood of other brokerage firms or banks, thus commanding a higher licensing fee.

Most companies will face objections from within the firm before they give away what they consider to be valuable trade secrets. The software product often gives a competitive edge over the company's direct competitors.

Some reasons a company will permit a valuable software product to be licensed to its competitors include the following:

- The company has a one- to three-year lead time in implementation.
- The competitive company usually implements a similar system anyway.
- The software product usually has such a potential for profit that it will more than make up for any loss in competitive edge.
- The developing company may retain some key features for itself so that the licensed product is not quite as comprehensive as the original.

Choosing the project team

Technical personnel. The most important element after a working product is the technical staff to support and improve the product. If the software was developed in-house, there should be a capable and sophisticated technical staff that can continue to support and maintain the software product as it is marketed to outside customers. If the software product has existed for several years, the technical staff may by then have been reduced primarily to less skilled maintenance programmers.

Before choosing a particular software product for intrapreneurial marketing, management should assure itself that it has the technical ability to support the product. The technical staff should come from within the ranks of the organization. If the ranks of the technical staff have been thinned out, capable personnel should be recruited prior to marketing the product. Usually there is one key technical manager, often a project leader, who was responsible for developing the software product. This individual should be recruited to head up the technical team.

While the software product is being refined for outside marketing, the project leader may be wearing two hats. He may still be heading the development effort for the in-house product as well as heading the project for the outside marketing effort. A project leader should be given some leeway to assemble a qualified and reliable technical staff.

Marketing personnel. Even a great product cannot sell itself. An excellent software product will still need a superb marketing effort to bring it to the marketplace. Thus, the marketing personnel will probably be the key employees in the new venture.

For the intrapreneurial business, the preferable choice for marketing director would be an individual from within the organization with proven marketing experience. In some cases, the company may have to go outside to recruit a marketing director.

Support staff. The licensing and distribution of a sophisticated software product is different from the sale of a manufactured item. Customer training and product maintenance are critical ingredients for a successful software product.

Adequate training staff should be

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in place by the time the software product comes to market. If trainers are not available to demonstrate the personnel, the software product implementation might fail after the first sale.

Sufficient technical maintenance personnel should also be in place prior to the first sale. Inevitably, some technical difficulties will arise at the time of the first software product implementation. The intrapreneurial company must be able to respond to these difficulties promptly and completely.

If this is not done, the initial installations may be frustrated and will not provide the positive references critical to a new software product.

To determine the scope of the training staff and technical maintenance personnel, the company might bring in a technical director who had previously supervised technical support for a software product.

> ***It is often more economical for a company to acquire software by licensing an existing software product that works rather than attempting to develop its own.***

Preparing the marketing effort

Evaluate the risk. The sale of a major application software system is a complex procedure. The sale often involves detailed proposals and many sales calls and customer contacts. A company entering this field with a complex product should recognize that it can sometimes take much more than a year to complete the first sale.

Thus, the company should be willing to commit the time and financial resources to fully analyze the market. A product should be upgraded and well documented prior to the marketing effort. The new software entity should be well financed, and the company should be prepared for a long marketing effort.

Joint venture. It is often difficult for any organization to enter into a new business without previous experience. It is sometimes advisable for a firm developing a software product to search for an already existing software company that understands the marketplace and can act as a joint marketing agent.

A joint venture can be mutually profitable. The developing company brings financial resources, technical expertise and a valuable software product. The already existing software company brings a valuable distribution network and marketing know-how.

However, joint ventures are risky affairs, often ending with both parties disappointed. Thus, it is advisable for any company entering into a joint venture to secure legal protection for the proprietary information it brings to the venture.

The company owning the software product should be certain that there is a written agreement that clarifies that it retains ownership of the software. The company might also add that any modifications or changes become part of the product to which the company retains full ownership.

The agreement should also specify that in the event of termination, the developer owns the product, and the marketing company has no further rights. It is not uncommon for both parties of a failed joint competition to continue to market the software product in competition with each other while disputing their respective ownership rights.

Service bureau. For a new product, marketing may be easier if the product begins as a service bureau operation. A service bureau owns computer equipment and provides all technical services for the customer. The customer may have only computer terminals on its premises that communicate via telephone lines to the service bureau's computers.

In using the service bureau, the customer will not have to make a large hardware investment to use the software. Once customers have used the software and are satisfied with it, they may decide to acquire the necessary equipment to leave the service bureau.

The software company must decide whether it wants to start up as both a service bureau and a direct licenser of the software. Establishing a service bureau is a complex and expensive venture in its own right. Technical staff must be on call for service bureau customers at all times, and additional hardware must be kept ready as emergency backup.

Some intrapreneurial companies have established business relationships with existing service bureaus that offer computer services on a reduced-fee basis to share in the income generated by the software. The initial marketing effort may be more successful if there is a service bureau for the customer.

Special legal issues

Software licensing. For a company that has never been in the software business, the concept of marketing and distributing software is often different from its previous experience. While most products are sold outright, software, when distributed, is licensed.

The licensee receives only a restricted license to use the product at its own facilities or on its own premises. The software company retains

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- ✓ Concurrent multi-user updating
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- ✓ Relational data views
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Protecting your software investment

An intrapreneurial software venture, like any software company, should include clauses pertaining to restrictions, copyrights and confidentiality within its product license. The following are examples of such clauses:

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All copies made by the Licensee of the software and other programs developed hereunder, including translations, compilations, partial copies with modifications and updated works, are the property of Licensor. Violation of any provision of this paragraph shall be the basis for immediate termination of this license agreement.

The following clause pertains to contracts with consultants for development work:

The consultant agrees that all developments made and works created by the consultant in connection with the company's assignments shall be the sole and complete property of the company and that any and all copyrights and other proprietary interests therein shall belong to the company.

The consultant agrees that, except as directed by the company, he will not at any time during or after the term of this agreement disclose any confidential information to any person whatsoever or permit any person whatsoever to examine and/or make copies of any reports or any documents prepared by him or that come into his possession or under his control by reason of his consultant services and that upon termination of this agreement he will turn over to the company all documents, papers and other matter in his possession or under his control that relate to the clients of the company.

The consultant acknowledges that disclosure of any confidential information by him will give rise to irreparable injury to the company or the owner of such information, inadequately compensable in damages. Accordingly, the company or such other party may seek and obtain injunctive relief against a breach or threatened disclosure of confidential information, in addition to any other legal remedies that may be available.

— Richard Raysman and Peter Brown

ownership of the product and can then issue similarly restrictive licenses to other customers.

The software company must take formal steps to retain rights to this intangible product. It must have all of its customers sign license agreements acknowledging that it owns the product and promising to keep the product confidential. If the software company fails to acquire a signed licensed agreement, it may lose its rights to the product.

Further, the software company should protect this product with copyright notices on the licensed software. Copyright protection is effective protection for computer software (see sidebar above). Failure to adequately obtain copyright protection of its software could result in the intrapreneur's loss of a valuable ownership right.

Limitation of liability. Manufacturing companies historically have sought to protect themselves from product liability claims that are a result of physical injury.

Computer software companies need to protect themselves from liability for errors in the computer program that result in financial losses.

For example, in a stock trading program, a simple computer error could result in the loss of millions of dollars if dividend checks are improperly prepared. In licensing, the software company wants to be certain that the use of its software product by its customers will not result in major liability claims.

The software company must adequately protect itself by using the license agreement to disclaim all but limited warranties and by limiting its financial liability.

Software companies often limit their damages to the total amount paid for a license. Thus, if the licensing fee were $50,000 and a disastrous loss occurred, the total liability of the software company would be limited to $50,000. For service bureau operations, the liability might be limited to the prior three months' service fees.

Software companies frequently seek to get a commitment from a customer by getting a simple letter of intent. This written agreement may refer to the work involved but rarely contains appropriate limitations of liability. The failure to obtain a complete, signed license agreement may expose the software company to a large potential liability.

Product description. A manufacturing company's products may be described by using a prototype or by existing goods. The distributor of a software product must be equally certain that the licensee understands exactly what is being licensed. The software company must provide a realistic and accurate description of the software product. If the software product is described as being significantly better than it really is, the customer will ultimately be disappointed.

One problem in the software industry has been customers whose expectations are much greater than the product that is eventually delivered. If a software vendor has described features that do not really exist, the disappointed customer may reject the product and might eventually file a lawsuit.

Confidentiality agreements. The intrapreneurial company must realize that it now possesses a valuable product. It must take steps to protect its product not only from future licensees but also from misappropriation by employees or by outside consultants who are working on the product.

The best way to protect the ownership rights in the software product is to have signed written agreements with employees and outside consultants. In those agreements, the employees and consultants acknowledge that the product on which they are working is owned by the company. With most capable consultants, this agreement will likely be vigorously negotiated.

Employees and outside consultants must also acknowledge that they will maintain the confidentiality of the software product.

Company support leads to rewards

Tremendous opportunities exist for an intrapreneurial company to obtain an entree into the software industry. Like all other new business ventures, the entree must be well planned, well staffed and well financed.

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Intrapreneurship is a new term for an old concept. Entrepreneurs start their own companies from scratch, while intrapreneurs, as employees of larger organizations, launch new ventures from within the organization.

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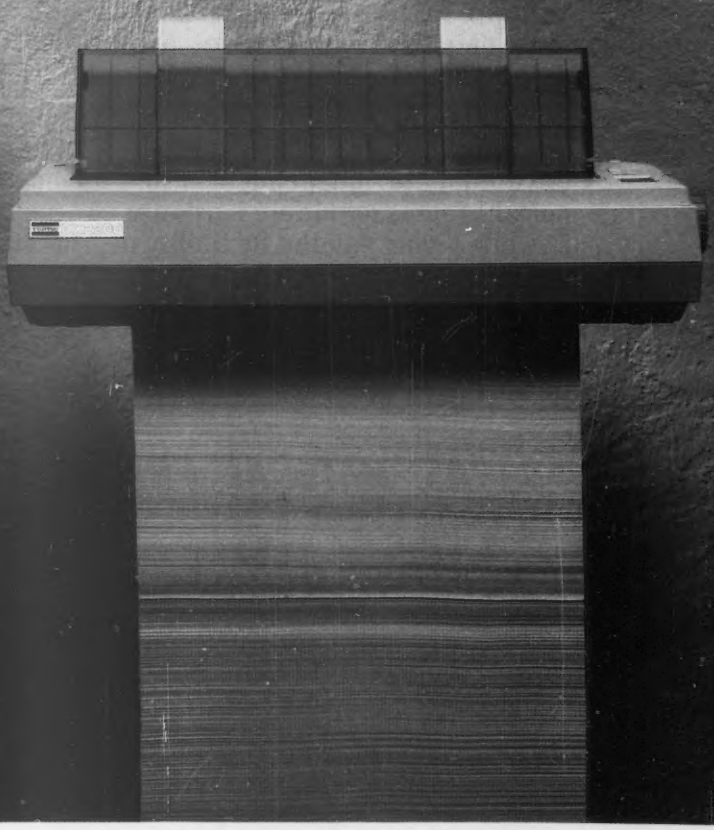


MANAGEMENT

TAKING CHARGE
Kenneth W. Kolence

Managing capacity

Capacity management is somewhat like the ugly duckling. The problem, you may recall, was that the duckling wasn't really a duck at all. Likewise, capacity management isn't really a technical issue; it's a management issue.

Unfortunately, capacity management, which includes planning and performance issues, is frequently assigned to only one segment of MIS.

This leads to ineffective management because a single technical function cannot carry the burden of ensuring that there will be enough computer resources to meet the needs of the entire company.

It is critical, therefore, that managers recognize that capacity management is a multifaceted issue, not just an ugly technical function. If it is to be successfully addressed, it must be part of many MIS functions, including aspects of both operations management and applications development.

In many companies, the senior operations manager is given primary responsibility for capacity management because he has authority regarding the hardware and systems software.

This manager cannot effectively carry out such a responsibility, however, because he does not have authority over the use of resources by the applications software.

To obtain accurate work load forecasts, particularly for new applications, the operations staff has to work

See **MANAGING** page 52

Kolence is a cofounder of Boole & Babbage, Inc. and currently works as a consultant in Palo Alto, Calif.

Agway branches into DP

Farmers' co-op subsidiary expects to reap profits

By David A. Ludlum

DEWITT, N.Y. — Agway, Inc., a farmers' cooperative and Fortune 100 company involved in manufacturing, distribution and finance, has set up its data processing operation as an independent, profit-oriented subsidiary.

The new unit, Agway Data Services, Inc., attracted its first customer, the 23-branch Syracuse Savings Bank, four months before formally going into business Jan. 1. It is currently providing four other clients with limited services in data processing off-load, network management, consulting and systems review.

Agway's LaHood

The foundation for Agway Data Services was laid in the varied experiences Agway's MIS department acquired in serving the company's range of businesses and from a tradition of customer-oriented service, according to Dennis J. LaHood, formerly Agway's MIS director and now president of Agway Data Services.

The MIS department has always charged internal users for services and development. "In that respect, the MIS department has always acted and thought of itself as a service bureau and has always attempted to have a customer orientation," LaHood said.

In launching the subsidiary, that foundation was built upon support from the MIS department and the company's chief executive, who is involved with a hospital that also began marketing data processing services, LaHood said.

Additional encouragement came from outside companies that approached Agway's MIS department "asking if things could be done for them," he stated.

Agway, formed by a merger of three farmers' cooperatives 22 years ago, distributes petroleum products and runs four manufacturing businesses, a wholesale distribution firm and a retail chain. The company also offers insurance, banking, finance and leasing services, generally for Northeastern farmers.

See **AGWAY** page 52

Retailers sold on integration

By David A. Ludlum

Retailers are focusing their attention on integrating systems that have been brought to maturity in recent years, particularly inventory control, point-of-sale (POS) and purchase order applications, according to a recent study.

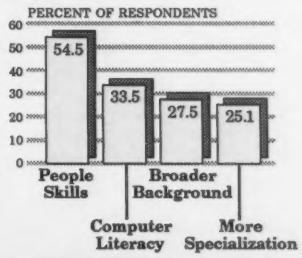
The study, conducted by accounting and consulting firm Arthur Young & Co., also found that the retailers it surveyed spent 0.91% of their sales on information systems in 1985. The total spending — $859 million — rose 11.6% from the previous year.

See **RETAILERS** page 54

•DATA VIEW

DP managers need people skills

Survey of 500 companies cites important attributes



INFORMATION PROVIDED BY COMPUSEARCH DIVISION OF MANAGEMENT RECRUITERS INTERNATIONAL, INC.

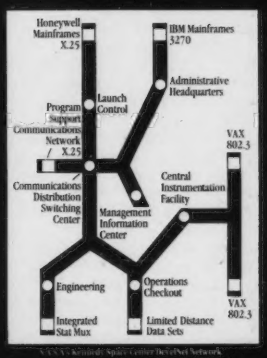
INSIDE

Calendar: Selected conferences, exhibitions, seminars/**56**

INSTANT ANALYSIS

"Like many companies, the majority of retailers now possess enough computer power to bury themselves in data."
— Frank Andrews, Arthur Young & Co.

The Common Sense Data Network



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Managing capacity

From page 51

with the applications development department as well as end users.

Since the applications staff and users do not consider capacity management a primary responsibility, they often do not realize the importance of providing operations with a useful forecast.

In addition, the operations manager has no control over the amount of work required per transaction for each application or the work-arrival rate for each part of the work load. The applications development department is responsible for determining both of these factors.

Without the necessary coordination and communication with other departments, operations essentially is forced to play a losing game in capacity management. To address capacity problems, the operations manager's only choices involve adding more hardware or improving the performance of present systems.

Multifaceted nature

The multifaceted nature of capacity management is often not recognized even within the operations department itself; the system tuning and planning responsibilities are divided among separate groups within the department.

To address these issues, the MIS manager should make capacity management a major responsibility integrated throughout his organization — and to do so he must make it a standard activity for all aspects of the organization.

For example, the people who allocate direct-access storage device (DASD) space should also be responsible for ensuring that DASD response time is maintained at reasonable levels. To accomplish this, they will need to have capacity management data from other departments, and the results of their efforts should be monitored at an appropriate management level.

A good way to begin the consciousness-raising is to require that the vice-president of information systems, as well as the directors of both the operations and applications development departments, sign service-level agreements. Such an action clearly states that service is a primary responsibility of the entire organization, not simply operations.

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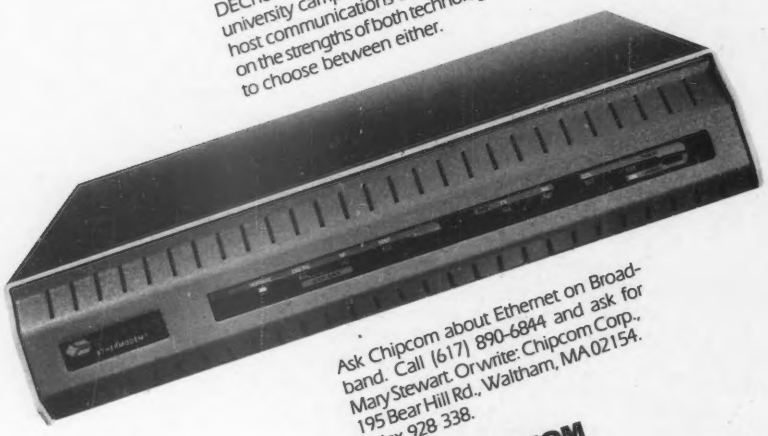

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Agway branches out into DP

From page 51

Agway Data Services, which has targeted all its parent company's lines of business as its own markets, operates two IBM 3081 Model K mainframes, one of them hosting a CICS network serving about 160 Northeastern locations.

Despite its service-oriented tradition and willing customers, the transition from internal unit to independent subsidiary has been marked by challenges in establishing financing and marketing, according to LaHood.

The move was formally launched last year by the commissioning of a study by John Diebold & Associates of Agway's DP capabilities and the opportunities to market them.

The most serious consideration was the effect on service to internal users, LaHood said. The company decided to expand computer resources and enhance the staff to accommodate each outside customer, "so that we weren't stealing resources from customers we were already servicing," he explained. The 140-employee subsidiary is also adding needed expertise in marketing, sales and finance.

Top management concerns in setting up the unit included whether Agway could meet its financial goals in a timely manner, according to Richard Radey, Agway, Inc.'s senior vice-president for finance and control and chairman of Agway Data Services.

"With most startup organizations, it generally takes longer to get the desired payback than what your original hope was," Radey said.

Radey said the capital investment required for the effort was "not overly significant," thanks in part to equipment leasing, and that the substantial commitment was in "getting the right human resources in place."

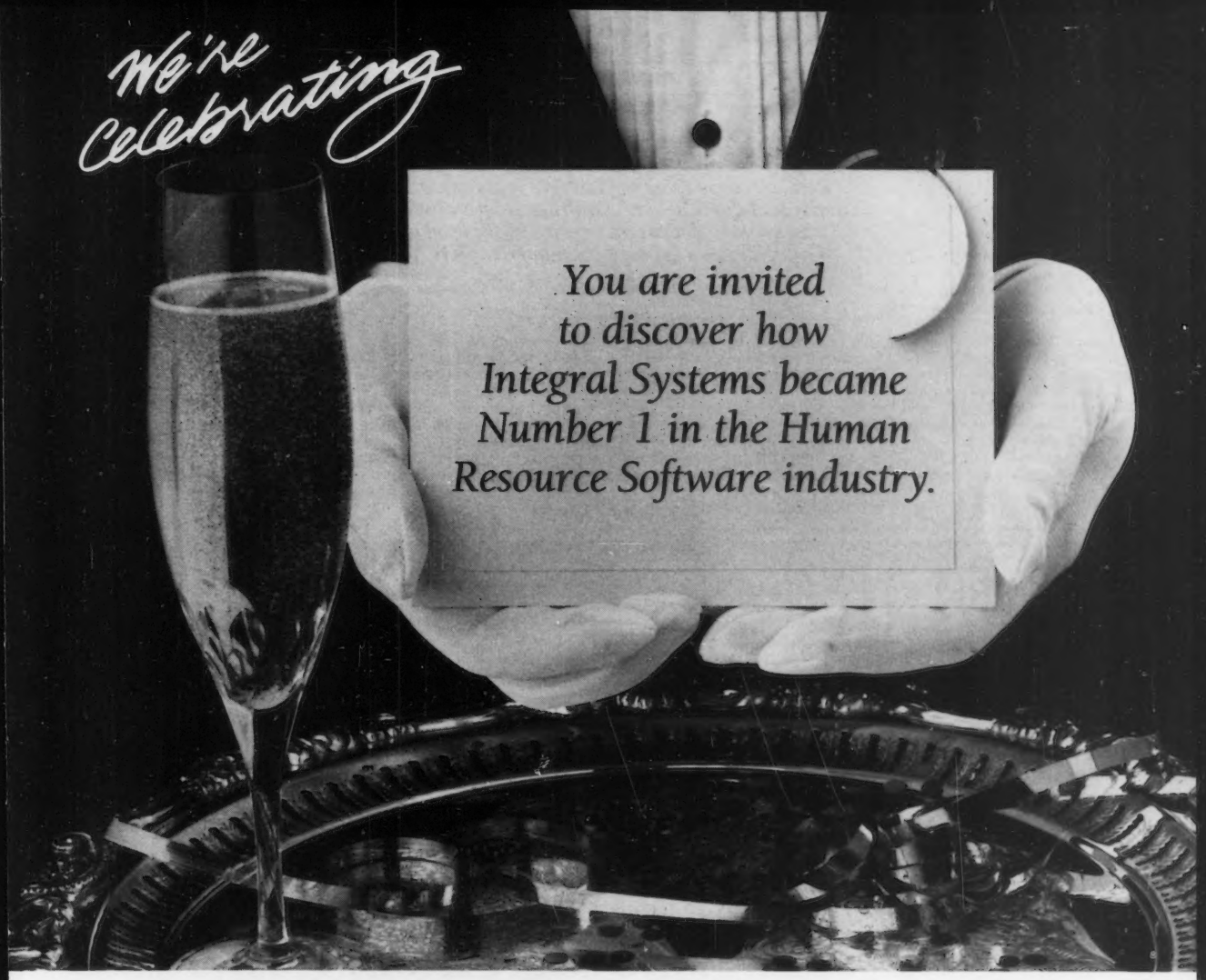
There are many other factors that facilitated the move to subsidiary status, according to Michael Weiner, vice-president of John Diebold & Associates, who was a consultant on the project. Agway's MIS organization was large and well run, and the Agway name brings recognition for quality in its market, Weiner said.

Several steps taken by Agway bode well for the subsidiary, he added. They include targeting Agway's "business and geographical footprints" in the market, garnering top management support and incorporating the unit.

Incorporation allows establishment of management incentives that are important for a relatively small, entrepreneurial organization but might be foreign to a large company like Agway, Weiner said. "Companies of that size typically have bureaucratic structure and management," he said.

LaHood and Radey declined to specify the financial and manpower requirements called for in setting up the subsidiary or to disclose projections for the unit's sales and profits.

LaHood said the change has not revealed any bureaucratic inertia in the MIS department that had to be overcome. "It has certainly increased the enthusiasm and excitement of our MIS department. Data processing professionals have all come forward enthusiastically about the expectations," LaHood said.



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Retailers sold on integration

From page 51

Arthur Young surveyed 127 mass merchandisers and chains of department, specialty and grocery stores with average 1985 sales of about $760 million.

The survey found many of the retailers' systems for jobs such as sales reporting and analysis, accounts payable, general ledger and payroll had reached maturity and that the companies are turning their attention to integrating their systems.

"Retailers have spent the last five years enhancing individual applications. Now they're spending their technology dollars on improving the level of integration between these applications," said Frank Andrews, Arthur Young's manager of retail consulting.

> ***'Retailers have spent the last five years enhancing individual applications. Now they're spending their technology dollars on improving the level of integration between these applications.'***
>
> — Frank Andrews
> Arthur Young & Co.

The integration "is an effort to let the left hand know what the right hand is doing," Andrews said. "Integration allows the different functional areas to use the same information in decision-making."

With inventory their biggest asset, retailers said they see systems for controlling inventories as the most critical area for integration, with 57% focusing on that area this year, according to the study.

"Retailers recognize the opportunity for greater profit and superior competitive position available through improved inventory management, and they are using technology to get there," Andrews said.

The study also found more retailers putting computing power in stores, particularly through the use of self-contained POS systems that can store data on stocks of goods, prices and transactions and also access credit records.

Andrews said the systems, costing as little as $3,000, can often communciate with other systems in stores so that, for example, a clerk can tell a manager he needs change or has spotted a shoplifting suspect. Most of the retailers reported efforts to integrate POS systems with others in stores.

The survey reflects the situation at Minneapolis-based Dayton Hudson Department Stores, a subsidiary of Dayton-Hudson Corp., according to Fred Asher, the chain's vice-president of MIS. Inventory management is the major concern there, and POS systems are "an integral part of that whole process," Asher said.

"The key to that is being in stock on wanted merchandise. We're providing the information systems to assist that process," he said. That calls for close integration of marketing, procurement and distribution systems, Asher added.

Inventory and POS are also leading concerns at K Mart Corp. in Troy, Mich., according to David M. Carlson, vice-president of corporate information systems.

K Mart has endorsed IBM's Token-Ring local-area network for linking in-store systems — such as its IBM Personal Computer AT-based ones for labor management, POS and receiving — and is developing all of them to accommodate Token-Ring, Carlson said.

A typical benefit of such interconnection is K Mart receiving systems' retrieval of retail prices, at which the systems log incoming shipments from POS systems. Retailers are careful to keep the prices in POS systems up to date.

The study found that in development efforts, specialty retailers and department stores are emphasizing merchandise planning applications to control stocks of seasonal goods, with about 20% of the respondents reporting they had recently completed a major system and about 45% ranking it as a major development or enhancement priority in the next year or two.

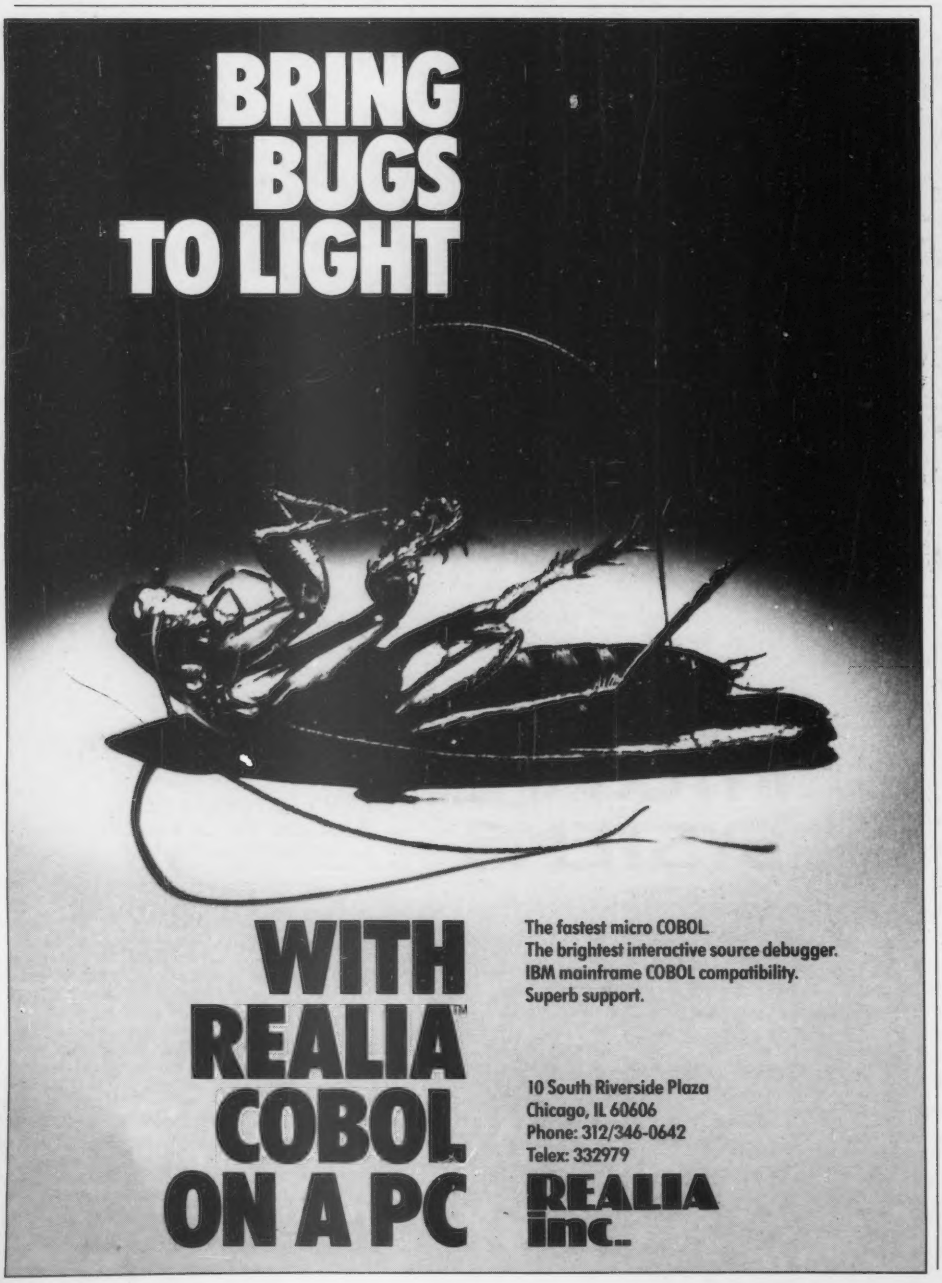
Cost control a priority

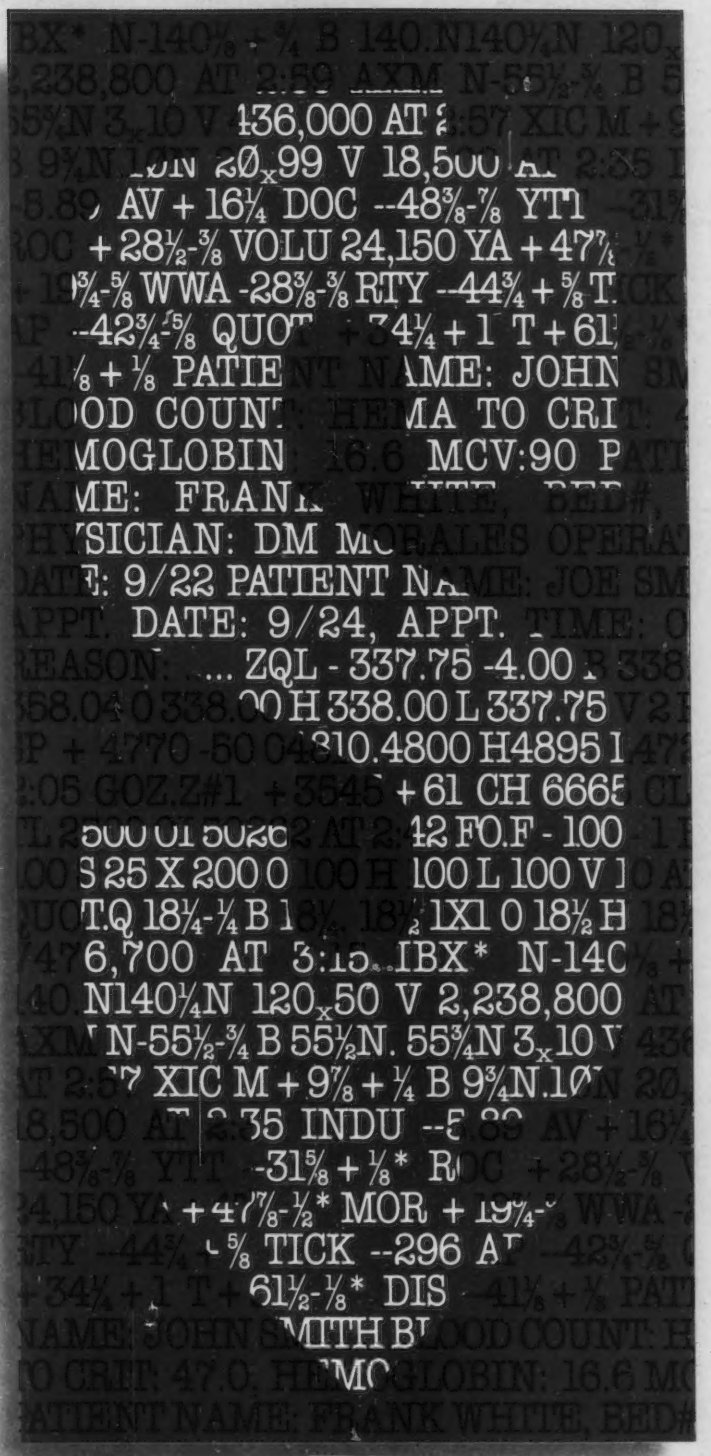
For mass merchandisers, however, purchase order management systems for controlling costs are the development priority; 19% said they had recently developed a system and 63% reported they plan to develop or improve one in the next 18 months.

The study found that the software packages retailers most often purchase — rather than develop in-house — include general ledger (53%), payroll (49%), accounts payable (35%), fixed assets (33%) and POS (24%).

Packages for POS systems have become more common because the systems often function similarly; most packages are driven by parameters, so they can be customized; and many offer sophisticated functions previously developed in-house, such as cashier productivity and scheduling, Arthur Young's Andrews said.

The retailers' expenses for training and for support of systems in stores rose 50% in fiscal 1985, indicating an emphasis on training end users in order to get the most from investments in systems, Andrews said.





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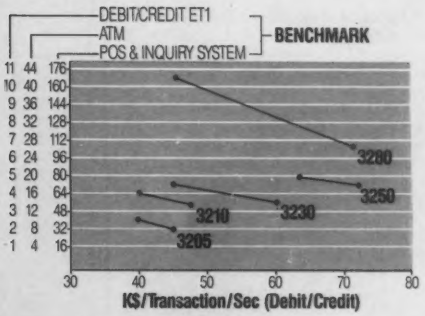

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Concurrent Computer Corporation

CALENDAR

JANUARY 25-31

Networking PCs. Cleveland, Jan. 26-27 — Contact: T. Jess Seiple, American Institute, 55 Main St., Madison, N.J. 07940. Also being held Jan. 29-30 in Denver, Feb. 5-6 in Kansas City, Mo., and Feb. 9-10 in Boston.

How to Negotiate with IBM. Orlando, Fla., Jan. 26-28 — Contact: International Computer Negotiations, 238 Christopher St., Upper Montclair, N.J. 07043.

Integrating Purchasing, Receiving and Accounts Payable Systems. Philadelphia, Jan. 26-30 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Mapper Installation, Coordination and Support. Dallas, Jan. 26-30 — Contact: Compumetrics Training Institute, P.O. Box 58383, Houston, Texas 77258.

NCITD Informational Forum. New Orleans, Jan. 27 — Contact: Eugene A. Hemley, Executive Director, National Council on International Trade Documentation, Suite 1200, 350 Broadway, New York, N.Y. 10013.

Corporate Disaster Recovery Planning. Columbus, Ohio, Jan. 27-29 — Contact: HSH, Inc., 2715 Tuller Parkway Drive, Dublin, Ohio 43017. Also being held March 24-26 in Philadelphia and Sept. 29-Oct. 1 in Los Angeles.

Annual Conference on Improving Productivity in EDP System Development. Phoenix, Jan. 27-30 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

National Insurance and Protection Conference of Financial Institutions. San Diego, Jan. 27-30 — Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Microsoft Windows Development Seminar. Boston, Jan. 28-29 — Contact: Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

1987 RIA Annual Meeting. San Diego, Jan. 28-30 — Contact: Robotic Industries Association, P.O. Box 3724, 900 Victors Way, Ann Arbor, Mich. 48106.

Keeping U.S. Manufacturing Globally Competitive. San Diego, Jan. 28-30 — Contact: Robotic Industries Association, P.O. Box 3724, 900 Victors Way, Ann Arbor, Mich. 48106.

Conference on Desktop Communications. San Francisco, Jan. 28-31 — Contact: The Seybold Group, Inc., Suite 132, 20695 Western Ave., Torrance, Calif. 90501.

Being More Profitable and Competitive with PC CAD/D. Sarasota, Fla., Jan. 30 — Contact: Maura Belliveau, Graphic Systems, Inc., 180 Franklin St., Cambridge, Mass. 02139.

FEBRUARY 1-7

Computer and Electronic Printers. Key Biscayne, Fla., Feb. 1-3 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Integrated Systems: What Can be Done Today? San Antonio, Feb. 1-4 — Contact: International Communications Association, Suite 710, LB-89, 12750 Merit Drive, Dallas, Texas 75251.

1987 ABA Bank Telecommunications & Data Processing Workshop. San Diego, Feb. 1-4 — Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Long Range Information Systems Planning. Dallas, Feb. 2-5 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Instructional Computing Conference VII. Orlando, Fla., Feb. 2-5 — Contact: Florida Department of Education, Educational Technology Section, Knott Building, Tallahassee, Fla. 32399.

Third International Conference on Data Engineering. Los Angeles, Feb. 2-6 — Contact: The Computer Society of IEEE, Inc., 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

Automated Clean Room Processes. San Jose, Calif., Feb. 3-4 — Contact: Robotics International of Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Digital Image Processing. Washington, D.C., Feb. 3-6 — Contact: Integrated Computer Systems, P.O. Box 3614, Culver City, Calif. 90231. Also being held March 17-20 in Boston.

Implementing LAN in Your Organization. Milwaukee, Feb. 4-6 — Contact: Center for Continuing Engineering Education, University of Wisconsin-Milwaukee, 929 N. Sixth St., Milwaukee, Wis. 53203.

National Information System Quality Assurance Association Meeting. New York, Feb. 5 — Contact: Peat, Marwick, Mitchell & Co., 1600 National City Center, Cleveland, Ohio 44114.

FEBRUARY 8-14

12th Annual SAS Users Group International Conference. Dallas, Feb. 8-11 — Contact: SUGI Registration, SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

Advances in Marketing Analysis: Research Applications and Decision Support Systems. Philadelphia, Feb. 8-13 — Contact: Office of Executive Education, The Wharton School, University of Pennsylvania, 200 Vance Hall, Philadelphia, Pa. 19104.

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MANAGEMENT

Prototyping: Implementation Strategies. Ottawa, Feb. 9-10 — Contact: Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

Fourth and 5th Generation Data Management Software. Boston, Feb. 9-10 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held March 2-3 in Chicago.

Project Management Software. New York, Feb. 9-11 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held March 23-25 in Chicago.

How to Design & Improve a Cost Information & Control System. Los Angeles, Feb. 9-11 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held Feb. 18-20 in Boston, Feb. 25-27 in Chicago, March 9-11 in New York, March 16-18 in Washington, D.C., and March 23-25 in Dallas.

Key Issues in Managing Information Systems. St. Petersburg, Fla., Feb. 9-12 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Communications Networks '87. Washington, D.C., Feb. 9-12 — Contact: CW/Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

A Manager's View of Expert Systems Building. Atlanta, Feb. 10-11 — Contact: Department of Continuing Education, Georgia Institute of Technology, Atlanta, Ga. 30332. Also being held April 9-10 in Atlanta.

Computer Aided Publishing '87. Washington, D.C., Feb. 10-12 — Contact: Computer Aided Publishing, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

Systems Design & Integration Conference. San Jose, Calif., Feb. 10-12 — Contact: Electronic Conventions Management, 8110 Airport Blvd., Los Angeles, Calif. 90045.

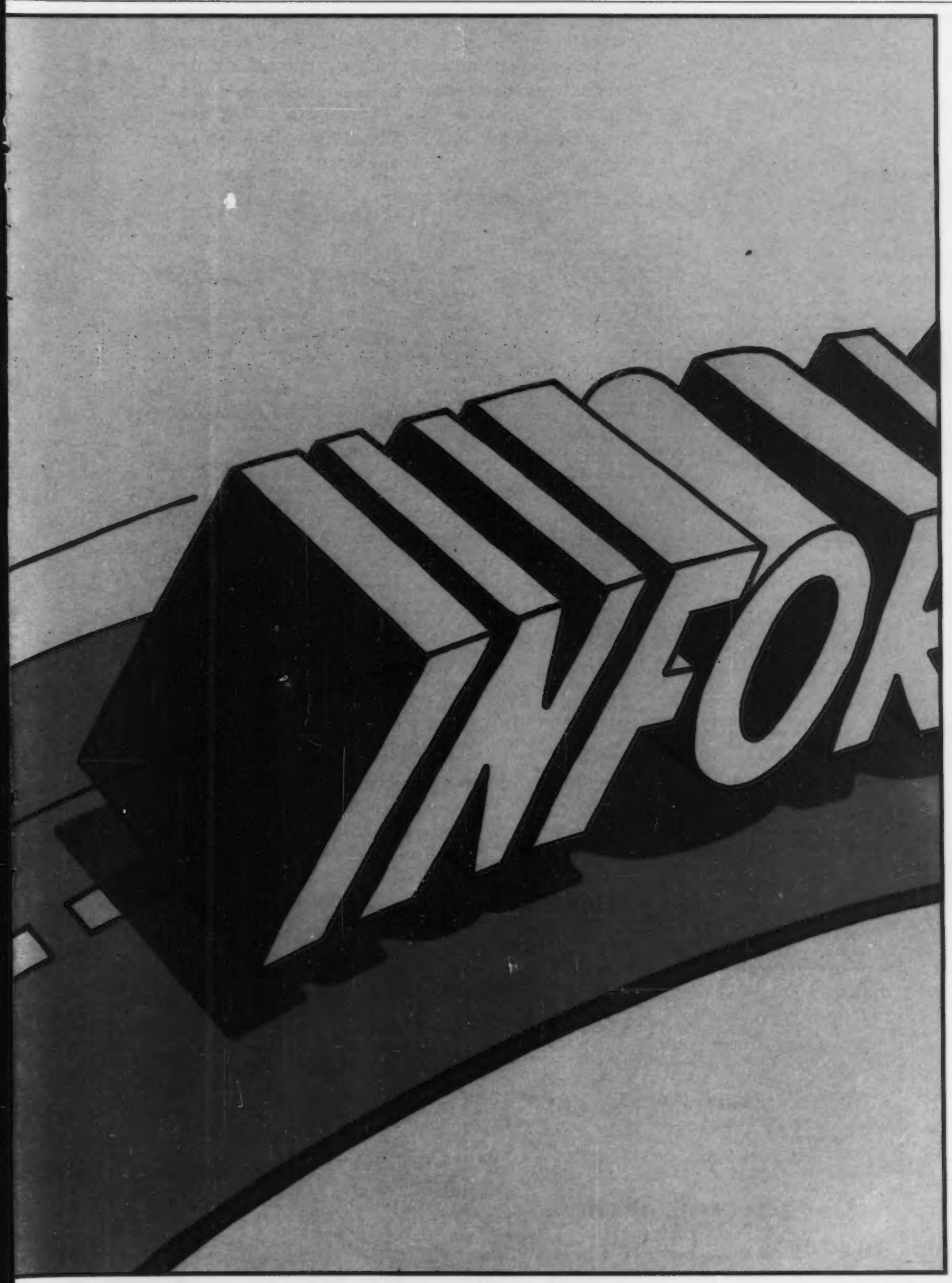
Real-Time Operating Systems: A Hands-On Workshop. Feb. 10-13, Toronto — Contact: Integrated Computer Systems, P.O. Box 3614, 5800 Hannum Ave., Culver City, Calif. 90231. Also being held March 3-6 in Washington, D.C., March 17-20 in Palo Alto, Calif., March 31-April 3 in Boston and April 21-24 in Los Angeles.

Creating Box Structured Information Systems: A New Approach for Information Systems Analysis and Design. Orlando, Fla., Feb. 11-13 — Contact: Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

1987 Bank Data Security Technical Symposium. Orlando, Fla., Feb. 11-13 — Contact: Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

AM/FM International Regional Conference on Automated Mapping/Facilities Management. Orlando, Fla., Feb. 11-13 — Contact: Barbara Emery, AM/FM International, #820, 8775 E. Orchard Road, Englewood, Colo. 80111.

South Florida Data Base Users Group. Ft. Lauderdale, Fla., Feb. 12 — Contact: 4780 N. State Road 7, Ft. Lauderdale, Fla. 33319.



FEBRUARY 15-21

Electronic Imaging '87. Anaheim, Calif., Feb. 16-19 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

15th Annual Association for Computing Machinery Computer Science Conference. St. Louis, Feb. 16-19 — Contact: Department of Computer Science, University of Pittsburgh, P.O. Box 13526, Pittsburgh, Pa. 15243.

Electronic Data Interchange. Alexandria, Va., Feb. 18 — Contact: American Trucking Association Management Systems Committee, 2200 Mill Road, Alexandria, Va. Also being held April 30 in Kansas City, Mo., and May 20 in Chicago.

Resource Planning for Central File Conversion. New Orleans, Feb. 18-20 — Contact: Innovative Systems, Inc., 341 Fourth Ave., Pittsburg, Pa. 15222.

Expo-IV (for Pick-based system users). Atlantic City, Feb. 18-20 — Contact: Expo-TMS, 22951 La Cadena, Laguna Hills, Calif. 92653.

Interactive Instruction Delivery. Kissimmee, Fla., Feb. 18-20 — Contact: Society for Applied Learning Technology, 50 Culpeper St., Warrenton, Va. 22186.

Electronic Data Interchange. Arlington, Va., Feb. 19-20 — Contact: TDCC, Suite 712, 1101 17th St. N.W., Washington, D.C. 20036.

FEBRUARY 22-28

1987 User Group Conference. Marina del Rey, Calif., Feb. 22-25 — Contact: Trax Software, Inc., 10801 National Blvd., Los Angeles, Calif. 90064.

Fourth Annual Electronic Printing Systems Conference. Miami, Feb. 22-26 — Contact: Dunn Technology, Inc., Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

Exchange Carriers Standards Association Technical Subcommittee T1Q1. Orlando, Fla., Feb. 23-27 — Contact: Radisson Plaza Hotel Orlando, 60 S. Ivanhoe Blvd., Orlando, Fla. 32804.

IBM: Mastering the Transition 1987-1992. New York, Feb. 24-25 — Contact: The Yankee Group, Seminar Division, 200 Portland St., Boston, Mass. 02114.

Computer Aided Software Engineering Symposium. Atlanta, Feb. 24-26 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Introduction to Performance/Capacity Management. Phoenix, Feb. 25-27 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

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Avanti Communications Corp.
* Aydin Monitor Systems
Banyan Systems Inc.
BCR Enterprises Inc.
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* BGS Systems Inc.
Brentec
Bridge Communications Inc.
* *Business Communications Review*
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* Cabletron Systems Inc.
* Canoga-Perkins
Carterfone Communications Corp.
* CASE Communications Inc.
CCMI/McGraw-Hill
C-COR Electronics Inc.
* Cellular One-The Washington/Baltimore Cellular Telephone Co.
Chipcom Corp.
* Chromatic Technologies Inc.
Coastcom
Codenoll Technology Corp.
Codex Corp.
Commtex Inc
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* Fairchild Data Corp.
* FiberCom Inc.
* FiberLAN Inc.
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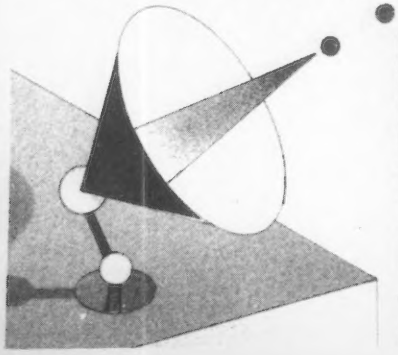

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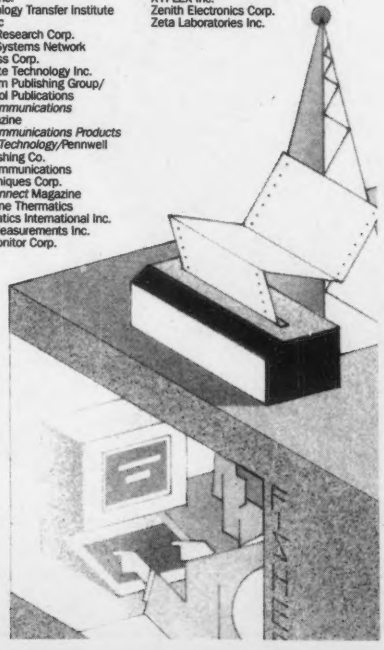

NEW PRODUCTS

Oracle adds VAX/VMS to SQL spreadsheet

Belmont, Calif.-based Oracle Corp. has announced a Digital Equipment Corp. VAX/VMS version of its SQLCalc spreadsheet facility said to allow users to access, update and create tables in a relational data base directly from a Lotus Development Corp. 1-2-3-like spreadsheet.

The VAX/VMS version is said to be functionally identical to the IBM Personal Computer version introduced in 1986. According to a company spokesman, users can move spreadsheets and data bases between the VAX and PC versions, using the same interface in both environments.

Users enter IBM SQL requests into cells, just like formulas. The SQL statements can refer to other spreadsheet cells, so users can change parameters and see new information from the data base. The SQL requests can be edited, copied, moved and projected just as formulas can.

SQLCalc provides Lotus-compatible features such as menus, data entry and flexible formatting of spreadsheet data

Using Oracle's SQLStar distributed data base management system architecture, users can concurrently access a VAX Oracle data base of unlimited size through a common spreadsheet interface running on any mix of PCs and VAX ASCII terminals.

Multiple concurrent users running SQLCalc or any of the vendor's other end-user and programmatic interfaces can access the Oracle data base. Security protection is extended to the field level by the Oracle security system, the vendor said.

VAX/VMS SQLCalc is priced based on the CPU size. It ranges from $1,000 for an initial license on a DEC Microvax I to $18,000 on a VAX 8800. Microvax II licenses cost $2,000, while the price on the VAX 8200 and 8300 systems is $7,200.

In addition, the Oracle relational data base management system must be licensed on the system with SQLCalc. Oracle base licenses cost from $5,000 to $90,000.

During the next few months, SQLCalc will be available in other operating system and computer environments, including IBM mainframes and Unix, the vendor said.

Cincom enhances Mantext

Release 1.4 allows users access to mainframe files

Cincom Systems, Inc. in Cincinnati has announced Release 1.4 of its Mantext mainframe text processing system.

The IBM CICS-based system is said to provide direct access to mainframe files; a text application development language; printer support in both batch and on-line modes; full-screen editing capabilities; free-form typing; and optional support for 10 languages — English, German, Danish, Dutch, French, Italian, Norwegian, Portugese, Spanish and Swedish.

According to a company spokesman, features of Release 1.4 include enhanced performance characteristics, improved productivity for users and new operational capabilities.

Specifically, Release 1.4 allows on-line users to format documents as an asychronous task. Users receive an immediate response from the terminal after sending a document to be printed.

Mantext now automatically truncates words at the end of each line of text according to the hyphenation rules of the particular language being used.

Users of the product are said to have access to a modifiable table that contains words that are intended to be hyphenated differently than was originally specified by Mantext.

The spool control system architecture now gives users control over the Mantext printer network, and a special library has been created in Mantext Release 1.4 for document models that are used by multiple users.

Mantext is priced from $33,000 to $62,000, depending on the modules purchased, configuration and languages selected, the vendor said.

INSIDE

Software & Services/62
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Systems & Peripherals/68

EMC disk subsystem features shadowing for Prime systems

EMC Corp. in Natick, Mass., has announced a fault-tolerant disk subsystem designed to increase the reliability and performance of Prime Computers, Inc. computers.

According to the vendor, the subsystem, which is said to provide fault-tolerant data storage using paired Winchester disk drives, employs a technique called shadowing.

Shadowing increases the availability of critical data by utilizing two disk drives that hold identical images of the same information, the vendor said. The technique is implemented using a 24-MHz controller called the IDS-4 Shadow Controller.

Performance boost claimed

The IDS-4 Shadow Controller is said to provide improved disk performance and flexibility in determining appropriate disk configurations in addition to fault tolerance. It operates two disk drives simultaneously so that when a problem occurs with one, it automatically accesses the other.

The controller is capable of supporting up to two drive pairs. It is based on a Motorola, Inc. 16-bit microprocessor and a direct-memory access (DMA) controller.

It comes equipped with an expanded memory buffer with a 512K-byte capacity and features an On-line/Off-line switch.

No changes needed

According to the vendor, it requires no changes to the Primos operating system or existing hardware and is 100% compatible with any Prime system at REV 19.2 or higher.

The IDS-4 Shadow Controller is available as part of an EMC disk-storage subsystem. The disk-storage subsystems feature 858M-, 510M- and 374M-byte drives.

An EMC disk subsystem employing an IDS-4 Shadow Controller and paired 510M-byte drives costs $25,500 plus $265 for 36 months, the vendor said.

DG offers Office/Publisher

Intercon's tool to be used with CEO software

Data General Corp. in Westboro, Mass., has announced an Independent Software Vendor agreement with Intercon Associates, Inc. for Office/Publisher, desktop publishing software that can be integrated with DG's CEO office automation software.

Intercon Office/Publisher software is said to provide CEO with office publishing functionality. According to a DG spokesman, Office/Publisher was designed to accept CEO-formatted documents and then recompose, paginate and produce graphics-quality output for use with laser printers or for phototypesetting.

Can access CEO functions

Users can access standard CEO functions such as electronic mail, filing and calendar while having access to the typesetting capabilties offered by the Intercon software, the spokesman added.

Specific commands can be created within CEO to add Office/Publisher features that let users set type and column size, justify margin ruling and then produce camera-ready output of each page set, the spokesman said.

Prices for Office/Publisher start at $5,000 for use on the entry-level DG Eclipse MV/2000 departmental computer systems.

Lexi introduces laser printer

A 10 page/min. laser printer said to have bar code capabilities has been introduced by Lexi Computer Systems Corp., located in North Andover, Mass.

Designated the Lexi 1087, the printer is said to be configured for the IBM mainframe environment. It features IBM Coax A plug compatibility and is also suitable for applications using the RS-232 serial port for electronic publishing environments outside the IBM mainframe world, the vendor said.

Other features include more than 50 resident fonts resembling popular typefaces such as Helvetica, Letter Gothic and Prestige Elite. Users also have the capability to create custom-size typefaces and download fonts. They may also utilize Hewlett-Packard Co. Laserjet Plus and Kyocera formats.

According to a company spokesman, the Lexi 1087 generates 300 dot/in. print resolution. It offers a 250-sheet manual-feed paper cassette; a paper output capacity of 150 sheets, face down; toner yield of 3,000 sheets; drum yield of 10,000 sheets; developer yield of 50,000 sheets; and an accessible clamshell design for maintenance purposes.

The Lexi 1087 is plug compatible with the IBM 3287 or 4214 printer Models 2, 3, 4 or 5 and attaches to IBM 3274 and 3276 controllers via the standard Coax A interface. It weighs only 64 lb, the spokesman added.

The Lexi 1087 Compact Laser Printer costs $5,690.

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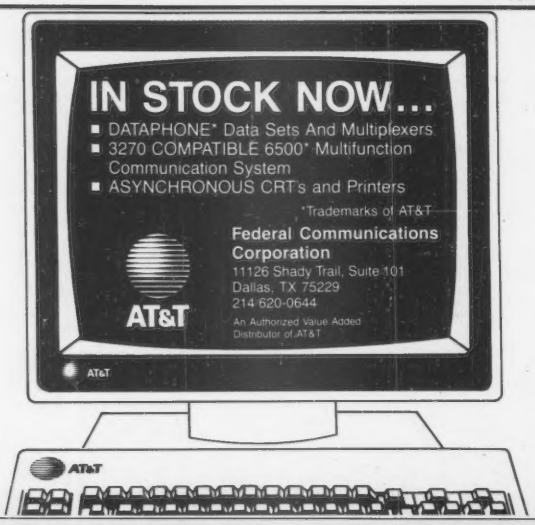


NEW PRODUCTS/SOFTWARE & SERVICES

SOFTWARE & SERVICES

Systems software

Profitkey International, Inc. has announced **Sales Analysis**, a module for its Profitkey manufacturing system.

The module is said to use sales information already captured in the data base to provide the reporting information needed to analyze the sales cycle and customer purchasing habits and manage the sales force.

Sales Analysis is priced at $4,000. Profitkey runs in multiuser environments under Microsoft Corp. Xenix and Unix on AT&T, IBM, NCR Corp. and Unisys Corp. computers.

Profitkey International, 200 Prestige Park, Salem, N.H. 03079.

Applications packages

AT&T has announced **Unitrax**, Unix System V-based video transaction and information retrieval processing software.

Starter application packages contain data base design structure, data base linkages, North American Presentation Level Protocol Syntax and ASCII starter data base on magnetic tape cassette or disk. The applications available include Product Catalogs; Literature and Product Ordering; Training Courses; Corporate Information and Support; and Business Communications. The packages can be customized and expanded using AT&T's Unitrax software Application Development System.

The binary software license fee ranges from $5,000 to $20,000. Each starter application package costs $750.

AT&T, 100 Southgate Pkwy., Morristown, N.J. 07920.

■

Daly & Wolcott, Inc. has announced **Release 1.0** of its **G/L History and Inquiry System** for the IBM System/36.

Written in RPG-II, the system is said to retain detailed general ledger transactions needed for the analysis of general ledger accounts. Inquiry may be performed by entering either account or journal reference information. Reports include G/L History Report/Worksheet by account, account ranges or journal reference and may be printed in detailed or summary form by dates. Period balances and net changes are printed on the reports along with a work area for notes.

The G/L History and Inquiry System costs $900.

Daly & Wolcott, P.O. Box 1509, East Greenwich, R.I. 02818.

Utilities

Alcyon Corp. has announced **DB68**, a C source-level debugger for its C68 Versados compiler.

DB68 is said to be a tool for symbolically debugging executable C programs at the source level. It provides a set of break-point commands and allows the user to debug without knowing the bit representation or size of C data types.

DB68 is priced at $950.

Alcyon, 5010 Shoreham Place, San Diego, Calif. 92122.

■

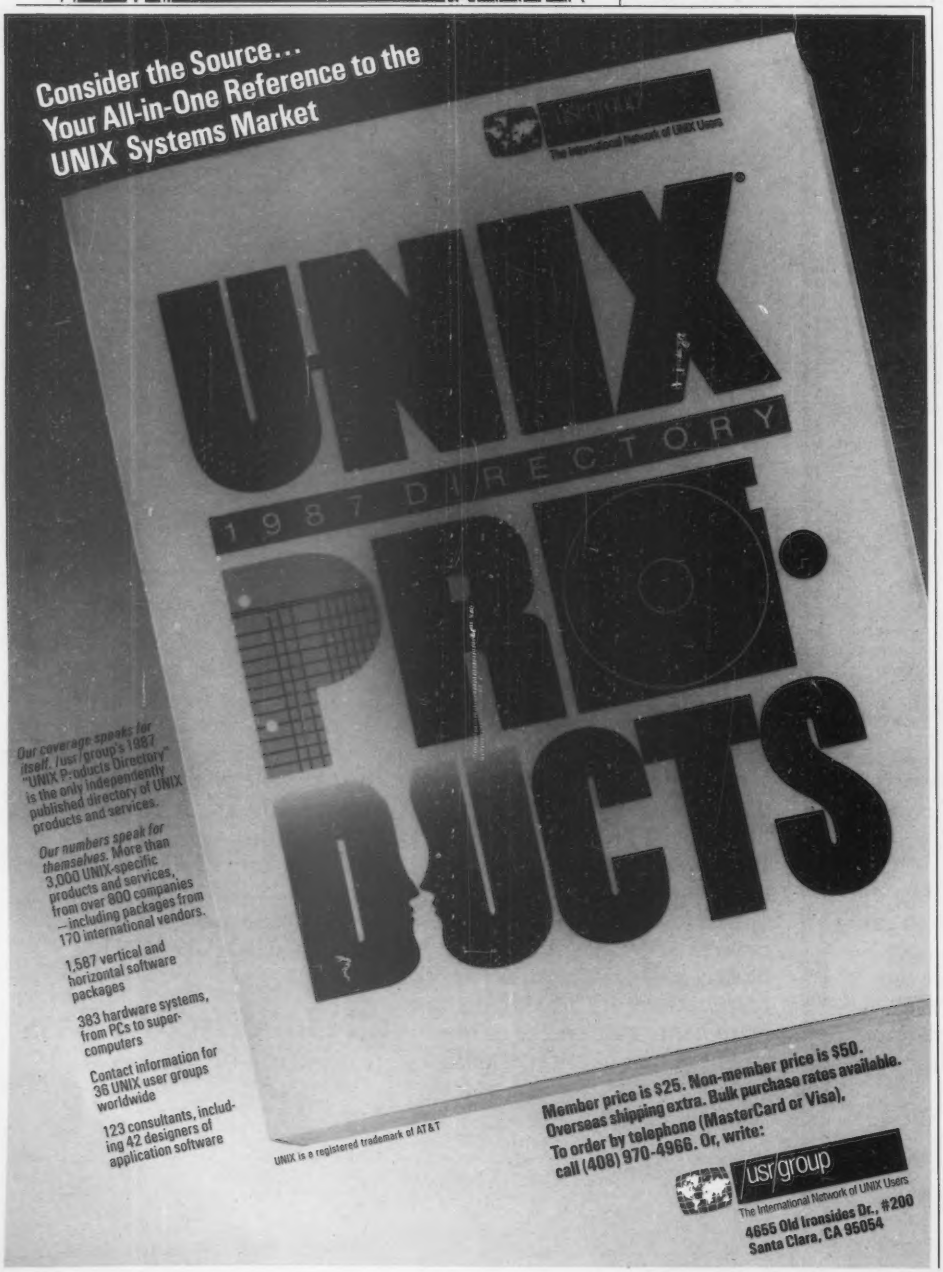
Axios Products, Inc. has announced **Pilot/MVS**, **Pilot/CICS** and **Pilot/SMF**.

Pilot/CICS is a reporting, tracking and modeling system. Pilot/MVS answers questions about the MVS and XA environments and depicts Resource Management Facility, direct-access storage drive, time-sharing option, paging and channeling information. They work with Lotus Development Corp.'s 1-2-3 to provide forecast, analysis and predictions based on mainframe data.

Pilot/SMF provides modules to clean, archive and format SMF records. It works with the other Pilot products by managing the mainframe data for transfer to a micro.

Pilot/CICS and Piot/MVS cost $3,500 each. Pilot/SMF costs $4,000.

Axios Products, 1455 Veterans Highway, Hauppauge, N.Y. 11788.



Softech Data Systems, Inc. has announced **Fist**, an RPG-II program generator for the IBM System/36.

Fist is said to produce RPG-II source code compatible with all existing applications and utilities. It allows users to create, modify and compile RPG-II entry, inquiry, report and update programs. According to the vendor, the program employs a comprehensive menu-, prompt- and Help screen-driven system.

Fist is priced at $2,950.

Softech Data Systems, 806 Rt. 17, Ramsey, N.J. 07446.

MICROS

Software applications packages

U.S. Data Corp. has announced a **run-time version of Factorylink**, its open-architecture real-time automation software for IBM Personal Computers, as well as a dynamic trending option for the package.

The run-time version is compatible with all Factorylink functional software, including interval and event timers, alarm supervisors, data logging, math and logic, networking and interfaces to industrial programmable controllers.

Dynamic trending permits users to add graphic trending charts to any color graphics display without programming.

The run-time kernel costs $1,750. The Dynamic trending option costs $995. The Factorylink foundation system costs $2,750.

U.S. Data, P.O. Box 850058, 1551 Glenville Drive, Richardson, Texas 75085.

Software utilities

Great Plains Software, Inc. has announced the **Great Plains Accounting series** for the Apple Computer, Inc. Macintosh personal computer.

The accounting series includes modules such as general ledger, accounts receivable, accounts payable, payroll, inventory, order entry with point-of-sale invoicing, network manager, purchase order and job cost.

Features include a reference manual, learning guide, 175 reports, instant look-up windows and data export capabilities.

Each module costs $695, except network manager and purchase order, which cost $395 each.

Great Plains Software, 1701 S.W. 38th St., Fargo, N.D. 58103.

Beacon Street Software, Inc. has introduced an application development and management system called **PC/Power** for the IBM Personal Computer and compatibles.

PC/Power is said to allow programmers to speed up and control the application development process. It supports various dialects of Pascal, C, Basic and Assembler languages. Developers can build screens with data fields, both of programs and of particular programming languages, that were predefined independently.

PC/Power is priced at $95.

Beacon Street Software, P.O. Box 216, State House, Boston, Mass. 02133.

■

Intersecting Concepts, Inc. has released **Backup Master**, a full-color, hard-disk backup utility for the IBM Personal Computer and compatibles.

The program is said to back up hard-disk data to floppies, other hard disks or cartridge hard disks. It is capable of performing a 10M-byte backup to 5 ¼-in. floppies in less than eight minutes, the vendor said. It also features such hard-disk file and directory management support features as full directory tree and file display, preview files capabilities and call Microsoft Corp. MS-DOS function.

Backup Master costs $69.95

Intersecting Concepts, 4573 Heatherglen Court, Moorpark, Calif. 93021.

Software enhancements

Mosaic Software, Inc. has enhanced its **Integrated-7** personal computer software package.

The new version includes the vendor's Lotus Development Corp. 1-2-3 Release 1A-compatible Twin Classic instead of the original spreadsheet module. Other modules include a relational data base management system; Datamail; business graphics; word processing with integral spell checker; terminal emulation; and PC-to-PC communications at up to 9.6K bit/sec.

The new version, Integrated-7/Twin, is priced at $199. Current users of Twin can upgrade for $99. Current users of Integrated-7 can upgrade for $45.

Mosaic Software, 1972 Massachusetts Ave., Cambridge, Mass. 02140.

■

Systems Guild, Inc. has announced a new version of the **Csharp Realtime Toolkit**, a package of real-time tools for the C programmer.

Csharp 3.0 is said to support real-time programming in the C programming language. The five tools included in Csharp provide interrupt handling and state system control.

Features of Version 3.0 include graphics drivers to the IBM Color Graphics Adapter and Enhanced Graphics Adapter and the Hercules Computer Technology, Inc. Monochrome Graphics Card.

A Csharp source license costs $495. Object production licenses cost $495 for 25 units or $2,475 for unlimited units.

Systems Guild, P.O. Box 1085, Kendall Sq. Station, Cambridge, Mass. 02142.

Data storage

Hewlett-Packard Co. has announced the **HP 9154B** 20M-byte rugged disk drive

Continued on page 66

Q & D

Like the F14 Tomcat, the **Q&D**tm system was designed with one goal in mind . . . *get the job done;* quickly, effectively.

Whether you are a manager, analyst, or programmer, **Q&D** can help you soar to new levels of productivity.

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Humble, TX USA 77347

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"Every application we looked to use HYDRA for has been accomplished. We are amazed with the simplicity and flexibility that HYDRA offers. We use HYDRA to drive laser printers as 3211 printers, support several types of ASCII terminals, and for PC to Host file transfer. For both local and remote applications HYDRA has been a tremendous help. We didn't even need a system programmer to set everything up."
Buddy Allee
Data Processing Manager
Tower Life Insurance, Co.

Communications
"As Hawaii's premier Inter-Island carrier it is vital for the information we transmit to reach its destination. This is why we chose the HYDRA. It enables us to use local and remote (including mainland) PC's to communicate data to/from our mainframe. We also download files containing member lists into PC's for preparation of personalized letters, for example, to our frequent fliers. We have been very impressed with HYDRA's performance!"
Natalie N. Playdon
Director-Computer Services
Aloha Airlines

Terminal Emulation
"HYDRA has been extremely effective in PC and switched access to the Host. Our students can use their PCs as a work station or a 3270-type terminal connected to the HYDRA. We have over 250 devices supported on 3 systems by HYDRAs which eliminated the need for additional dedicated controllers. We found HYDRA costs less than we were spending on our previous protocol converter each year in maintenance alone."
Kelly McDonald
Technical Support Manager
Brigham Young University

HYDRA

Dial-In Support
"HYDRA allows students and programmers off campus to dial-in and work on projects. With support for such a wide variety of devices HYDRA enables virtually any ASCII terminal or PC to talk to our system. This is ideal for us as we can cater for students no matter what terminal or PC they may be using. We are thrilled with the performance of the HYDRA and would definitely recommend it as a strong asset for any data processing center."
Dwight Ayle, Sr. Instruction Programmer Analyst
Mt. San Antonio College

1403 Printer Emulation
"HYDRA's 1403 printer emulation has been a real money saver for us. We use Printronix 600 LPM printers defined as 1403's for jobs that would normally require expensive laser printers. HYDRA's versatility made it possible for us to generate our bar coded inventory tags. Our customers and programmers also appreciate HYDRA's dial-in capabilities."
Steve Brown
Data Processing Director
R.M.S.A.

3211 Printer Emulation
"With HYDRA's 3211 printer emulation support, our customer reps can print sample documents on their matrix printers and review them before we begin a major production run. We had a definite need, and HYDRA was the solution to our problem. What really helped was not needing to go through a front-end processor or additional controllers. HYDRA channel attaches, which made things very simple for us."
Jim Mountain
System Consultant
Mailing Services of Pittsburgh

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NETWORKING

Continued from page 63

and the **HP 9153B** 20M-byte drive with 3½-in. microfloppy.

Features of the 20M-byte drives include write protection, data protection, IBM Personal Computer compatibility and increased data throughput up to 50% more than the HP 9133H/9134H 20M-byte products.

Designed for use in computer-aided design and engineering systems as well as for word processing, business graphics and spreadsheets, the drives cost $2,390 for the HP 9154B and $2,740 for the HP 9153B.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

■

Micropolis Corp. has announced the **1330 Series Powerdrives** for IBM Personal Computers.

The Powerdrives are hard disk drives. According to the vendor, they can upgrade most ST506/412-interface personal computers to capacities of 44M, 53M or 71M bytes. They offer 30-msec. average access time and a 25,000-hour mean time between failures.

Prices for the 1330 Series Powerdrives range from $995 for the 44M-byte drive to $1,595 for the 71M-byte drive.

Micropolis, 21123 Nordhoff St., Chatsworth, Calif. 91311.

Printers/Plotters/Peripherals

QMS, Inc. has announced the **QMS-PS800+** Postscript printer and the **QMS-PS2700CK** Postscript-based controller for use with Xerox Corp. 2700 laser printers.

The QMS-PS800+ is an 8 page/min. laser printer with 35 resident type styles. It is compatible with the IBM Personal Computer and Apple Computer, Inc. Macintosh and provides text and graphics printing at 300 by 300 dot/in. resolution.

The external 2700CK controller allows the Xerox 2700 to accept the Postscript page description language. It adds graphics and font-scaling capabilities.

The QMS-PS 800+ printer costs $5,495. The 2700CK controller costs $5,995.

QMS, P.O. Box 81250, Mobile, Ala. 36689.

Board-level devices

Univation has announced its **Dream Board** turbo-EMS enhancement card now offers IBM Enhanced Graphics Adapter (EGA) capabilities.

The Dream Board with EGA is said to offer up to 2M bytes of random-access memory (RAM) with the Lotus/Intel/Microsoft Expanded Memory Specification (EMS).

Features are said to include IBM EGA compatibility; IBM Color Graphics Adapter, Monochrome Display Adapter and Hercules Computer Technology, Inc. Monochrome Graphics compatibility; 256K bytes of display RAM; 64 colors; RAM-loadable character set; light-pen interface; and utility software.

The Dream Board with EGA costs $1,250 with 1M byte of EMS RAM and $1,595 with 2M bytes.

Univation, 1231 California Circle, Milpitas, Calif. 95035.

■

Ideassociates has announced **All Aboard 286**, a surface-mount technology board for the IBM Personal Computer XT 286 and PC AT.

The multifunction board offers 16M bytes of memory, serial and parallel ports and IBM Enhanced Graphics Adapter capabilities.

According to the vendor, three memory options are available. Conventional memory brings the AT from 512K bytes to 640K bytes. Up to 4M bytes of Expanded Memory Specification can be added. Up to 16M bytes of extended memory are also available on the multifunction board.

All Aboard 286 is priced at $995 with 128K bytes of memory; 4M bytes of memory cost $2,595; and 16M bytes cost $12,995.

Ideassociates, 29 Dunham Road, Billerica, Mass. 01821.

Auxiliary equipment

Renex Corp. has announced the expansion of the storage buffer of its **Datahawk** data line monitor add-on package for the IBM Personal Computer and compatibles.

The Datahawk storage buffer has been expanded from 32K bytes to 320K bytes of memory, an attribute that allows users to save and record more gathered information while monitoring dedi-

Nobody knows mor IBM PCs

IBM® has put a lot of thought into building the finest personal computers in the business.

We've also put a lot of thought into developing ways of linking them together. So each PC can serve as an integral part of an information system.

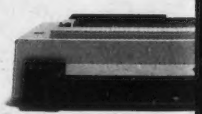
As a result, IBM offers local area networking* and communications products that can help any size business be more productive.

Share and share alike.

The IBM PC Network, for example, is designed to accommodate the needs of small work groups. This network can connect a number of PCs.

It lets them share information. And share peripherals, such as storage devices, plotters and printers, so the equipment you've invested in can serve more people.

For even larger communications needs, IBM offers the Token-Ring Network. It allows you to connect up to 260 devices on a single ring.



In addition, the IBM Token-Ring Network can grow to an almost unlimited size by simply connecting with other IBM Token-Rings or PC Networks.

If your business runs on an IBM System/36 or System/38 minicomputer, what you need is one of the IBM PC 5250 Emulation Programs. They let connected PCs share information as well as access files.

cated lines.

According to the vendor, Datahawk also features unlimited triggers, which offers users the ability to define any kind of event to set off an alarm.

Datahawk, including a range of codes, communications protocol parameters and specialized communication interface and software, is priced at $1,175.

Renex, 1513 Davis Ford Road, Woodbridge, Va. 22192.

NETWORKING

Communications controllers

Equinox Systems, Inc. has unveiled the **MDX**, a networked data private branch exchange.

The switch is said to allow keyboard-controlled port sharing and to allow micros to share printers and modems. It ties up to 16 devices into a local network.

The MDX allows terminal users to be connected to more than one computer port and to select ports from the terminal keyboard. It supports eight lines and can be expanded to 16 by adding an Equinox LM-8 Local Multiplexer. All lines can transmit asynchronously up to 19.2K bit/sec.

The eight-line MDX costs $800. The eight-line LM-8 expansion costs $700.

Equinox, 12041 S.W. 144 St., Miami, Fla. 22186.

Voice/data communications

Berkeley Speech Technologies, Inc. has announced the **Bestspeech Integrated Telecommunication System**, said to combine digital storage of human voice messages with its TTS proprietary text-to-speech conversion process.

Bestspeech systems are said to provide spoken output of computer information. The systems include the necessary hardware and software for telephone applications with Touchtone encoding and decoding.

The Bestspeech System Prototyping Package for developers runs in microcomputers and includes a digital signal processing board with jacks for telephones and speakers. The standard package costs $3,250.

Berkeley Speech Technologies, 2409 Telegraph Ave., Berkeley, Calif. 94704.

Software

SDM International, Inc. has announced **SDM/Link**, a combined System Network Architecture/Binary Synchronous Control (SNA/BSC) batch communications product.

SDM/Link is said to provide CPU-to-CPU data transfer capabilities for IBM 3000, 4300 and 9300 series systems. It can be used as a Remote Job Entry (RJE) workstation for IBM's RSCS, JES2, JES3 and Power/RJE subsystems. It can support file-to-file data transfer as either the host or terminal. Supported features include manual and autodial, leased or switched lines and space compression and expansion.

SDM/Link runs in a batch environment under any IBM DOS/VSE or MVS operating system. It costs from $5,000 to $12,000.

SDM International, 134 Spring Ave., Fuquay-Varina, N.C. 27526.

Multiplexers/Modems

Data Comm for Business, Inc. has announced the **SPL family of statistical multiplexers** featuring an on-line manual.

The multiplexers concentrate up to 14 asynchronous terminal ports over one composite communications channel. The full-duplex composite may be asynchronous or synchronous. Dial-up or leased-line modems, digital service units, synchronous multiplexers or other equipment up to 19.2K bit/sec. may be used between SPL locations. The manual is accessed through an asynchronous port.

Models are available from two to 14 ports in two-port increments. Prices range from $795 to $2,995.

Data Comm for Business, 807 Pioneer, Champaign, Ill. 61820.

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Simply put, these programs give each PC access to your company's information resources.

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In a network of PCs, IBM's advanced Emulation Programs (Versions 2.0 and 3.0) enable one PC to act as a "gateway" or communications server. Bringing the power of a mainframe to many users on the network.

For those who need multitasking capabilities, IBM offers the IBM 3270 PC workstation. With it, you can work with up to four mainframe sessions and six PC DOS sessions concurrently.

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To get started with IBM's connectivity options, just link up with an Authorized IBM PC Dealer. Or call your IBM marketing representative.

For the name of a store near you, call 1-800-447-4700.† IBM®

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Local-area networks

Control Data Corp. has announced its **XN line of data communications products** designed for networks with large numbers of terminals accessing multiple applications on multiple IBM host mainframes.

The XN systems are said to be able to support networks of more than 4,000 host computers and more than two million terminals. An XN communications processor supports up to 254 communications lines and more than 8,000 terminals; XN device interface subsystems are said to extend and improve IBM Virtual Telecommunications Access Method/Systems Network Architecture environments.

XN users can access multiple applications concurrently.

A typical system including hardware and software supporting 196 communications lines and two hosts costs $565,000.

Control Data, 8100 34th Ave. S., Minneapolis, Minn. 55440.

Test equipment

Standard Logic, Inc. has announced **Datamon**, an RS-232 communication analyzer, monitor and patch panel designed for real-time testing of all RS-232 networks.

The Datamon analyzer is said to allow the user to view a real-time data transfer in several different formats. It also records data to its 32K-byte buffer memory. It provides complete breakout box capability, status LED monitoring, bit/sec. rate conversion and data pattern triggering, the vendor said.

The Datamon analyzer costs $795.

Standard Logic, P.O. Box 3219, 132 Business Center Drive, Corona, Calif. 91720.

■

Tekelec has announced the **TE821C** multiplexer/demultiplexer, designed to give users multiplexing and demultiplexing capabilities to analyze T1C data and test standard T1C multiplexer/demultiplexers.

The stand-alone unit allows users to analyze T1C data from a T1C multiplexer and simulate a variety of errors to provide stress testing for a T1C demultiplexer. It also offers B8ZS capabilities for T1C testing. The B8ZS option is said to increase the quality of T1C testing by inserting a special transmission code to assure reliable clock recovery.

The TE821C is priced at $4,250. The B8ZS option costs $1,750.

Tekelec, 26540 Agoura Road, Calabasas, Calif. 91302.

SYSTEMS & PERIPHERALS

Printers/Plotters

Greyhawk Systems, Inc. has introduced three user options, **Cadam Red Line, Plot Utility** and **Plot Storage**, said to make its Softplot 2122 paperless plotter interactive.

The Red Line option is said to permit the user to make annotations and store them within the data base.

The Plot Storage option is said to allow drawings to be stacked locally for review. The Plot Utility option is said to allow images to be panned or zoomed.

The Cadam Red Line option costs $8,000. The Plot Utility package costs $1,850, and the Plot Storage package option costs $3,200 for 2M bytes and $5,000 for 4M bytes. The Softplot 2122 costs from $39,750.

Greyhawk Systems, 1557 Centre Pointe Drive, Milpitas, Calif. 95035.

■

Rutishauser of America, Inc. has announced the **Paperpro 88 series** of cut-sheet feeders for dot matrix and daisywheel printers.

The printers feature third-bin envelope or multipart form-feed capability; reverse feeds up to 65 lines for columnar or graphics printing; support for a full range of paper sizes in portrait or landscape format from any bin; and forward or reverse order collation of output.

The Paperpro 88 paper supply bins have a 150-sheet capacity. They are priced from $45.

Rutishauser of America, 10345 Brockwood Road, Dallas, Texas 75238.

■

Lexi Computer Systems Corp. has announced its **1087 Compact Laser Printer** with bar-code capabilities.

The printer features IBM Coaxial A plug compatibility. It also features more than 50 resident fonts. It is said to generate 300 dot/in. print resolution and offers a 250-sheet manual-feed paper cassette; a paper output capacity of 15 sheets, face down; toner yield of 3,000 sheets; drum yield of 10,000 sheets; and developer yield of 50,000 sheets.

The Lexi 1087 costs $5,690.

Lexi Computer Systems, Suite 1D, 231 Sutton St., North Andover, Mass. 01845.

Data storage

California Peripherals Corp. has introduced the **Model CP-240** ½-in. cartridge streaming tape drive.

The Model CP-240 is said to use the IBM 3480 cartridge or equivalent to provide 240M bytes of formatted storage. It has an enhanced small device interface-level interface and offers an optional small computer systems interface-intelligent interface. Data transfer rate is 250K bit/sec. at a tape speed of 2.0 meter/sec.

The Model CP-240 costs $1,950.

California Peripherals, 19701 S. Vermont Ave., Torrance, Calif. 90502.

How to get from dial tone to CTS with UDS' new 224A/D

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Here's a new user programmable, full duplex 2400 bps modem that can handle the entire auto-dial and log-on sequence with a single keystroke! It's the UDS 224A/D — the intelligent version of our 224.

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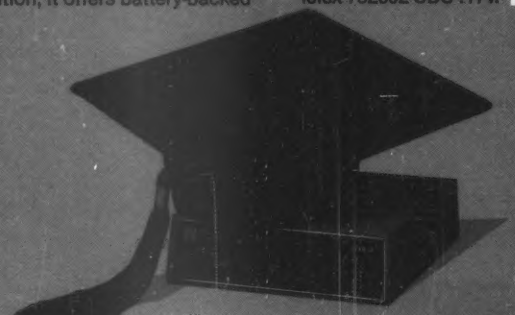
For detailed specifications, contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Phone 205/721-8000; Telex 752602 UDS HTV.

NEW



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COMPUTER INDUSTRY

Section begins on page 94

Ultimate attributes success to serendipitous business acumen

Pick systems vendor finds lucrative mart

By Alan Alper

EAST HANOVER, N.J. — Serendipity can be just as important as business acumen in getting a fledgling computer company into high gear. Theodore Sabarese, founder and chairman of 8-year-old The Ultimate Corp., a vendor of Pick-based systems, can attest to that.

Being in the right place at the right time has enabled Ultimate to offer systems running its enhanced version of Pick on the hottest hardware around. Ultimate began as a vendor of Pick systems based on Honeywell, Inc. minis and now offers Pick on Digital Equipment Corp.'s large-scale integration and VAX computers and IBM 4300 processors.

Using a worldwide group of value-added resellers, Ultimate has grown from $260,000 in revenue in 1979 to $140 million in the fiscal year that ended last April. Earnings have risen from almost zero in 1979 to $14.4 million in fiscal 1986.

Ultimate's arrangement to sell Pick-based systems on DEC's entire family of VAX systems, from the Microvax on up, has turned out to be a blessing. The firm's involvement in the VAX market comes at a time when demand for the DEC processors has never been higher.

Sabarese's serendipity has early roots. As a leading dealer during the late 1970s of Pick-based systems built by the then-struggling Microdata, Inc., Sabarese figured there had to be a better way to promote the little-known operating system.

He and another Microdata dealer got together and, with the blessing of the Pick operating system's author, Dick Pick, started Ultimate on a couple of thousand dollars and a prayer. Sabarese then struck a deal to sell Pick-based Honeywell minis, and Ultimate has never looked back.

Ultimate's Sabarese

At the time, Pick was the province of a fanatical few who worshipped the decade-old operating system's portability, ease of use and strong data base management capabilities. Today, there are almost 70,000 Pick-based systems installed worldwide, according to Infocorp, a Cupertino, Calif., market research firm. Ultimate has risen through the ranks to become the No. 3 supplier of Pick-based systems, according to Infocorp.

Although Pick still suffers somewhat from a lack of recognition within the data processing community, some industry analysts feel the operating system is now regarded as a viable alternative to Unix in multiuser and multitasking applications.

"There is significantly more acceptance of Pick than people give the operating system credit for," Sabarese suggests. "Six of our dealers were recently acquired by major corporations — firms like Continental Insurance, Security Pacific Bank, Automatic Data Processing, Inc. and American Hospital Corp. That's a pat on the back for Pick."

Although Ultimate is Honeywell's largest OEM customer, the control of Honeywell's computer business by France's Compagnie des Machines Bull and Japan's NEC Corp. should not hurt Ultimate's business prospects, Sabarese predicts. Bull has sold and serviced Ultimate's machines in France for some time, and Jacques Stern, the French firm's chairman, is a "Pickee," Sabarese says.

"Before, we were a significant customer of a large company that did many other things besides sell computers," according to Sabarese. "Now, we'll be a large customer of a larger company that is only involved in computers."

In the IBM world, Ultimate's good fortune continued in 1986. By acquiring rights to market Pick-based systems on the IBM 4300 from Systems Management, Inc., a Chicago dealer, Ultimate also received rights to the IBM 9370, Big Blue's new family of mid-range processors.

"We think [the 9370] is going to be an instant winner for IBM and tremendous business for us," Sabarese declares. "The machine costs more and offers less performance than our other products in that class, but people will want it because IBM has never had a product in that vertical market before."

Product and market expansion for publicly held Ultimate, however, have not come without some roadblocks. Ultimate was hit with lawsuits last summer by shareholders who claimed the firm, after completing a secondary stock offering, did not provide warning that earnings for its first fiscal quarter would be lower than expected.

Sabarese concedes the earnings and revenue shortfall occurred because Ultimate tried to do too much at once. "I think the lawsuits will sit dormant for two years," he speculates. "I'm confident that there was no fraud committed, and as the year unfolds and we reach our goals, all will be forgotten."

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TI settles two lawsuits on RAM chips

By James A. Martin

DALLAS — Texas Instruments, Inc. has reached settlements with Japan's Fujitsu Ltd. and Sharp Electronics Corp. regarding patent infringement lawsuits filed by TI to protect its dynamic random-access memory (RAM) semiconductor technology.

Under the agreements, TI will license its dynamic RAM patents to the two companies in exchange for significant royalty payments to be paid until the licenses expire in late 1990. In addition, TI will receive per-unit royalties based on the use of its dynamic RAM patents. The company did not disclose the amount of the royalties.

TI filed patent infringement suits against Fujitsu, Sharp and seven other Japanese and South Korean chip manufacturers in January 1986, claiming the firms were using TI semiconductor technology for their own products. The suits also claimed the chips made from TI technology were sold in the U.S. without licenses.

Intellectual property

The settlements were seen as important to the semiconductor industry in its battle to establish products as intellectual property. "The settlements also establish the fact that there is, after all, some validity to patent protection," said Edward C. White Jr., an analyst with E. F. Hutton & Co.

The greatest significance, however, is for TI. Such royalties could have meant an extra $27 million in pretax income for TI in 1986, said Michael Gumport, an analyst with Drexel Burnham Lambert, Inc.

"In general, these settlements should slightly increase dynamic RAM prices, slightly reduce Japanese competitiveness and significantly increase TI's competitiveness," Gumport said.

Still pending are TI's patent infringement suits against Hitachi Ltd., Oki Electric Industry Co., Mitsubishi Electric Corp., Matsushita Electric Industrial Co., NEC Corp. and Toshiba Corp. in Japan and South Korea's Samsung Co.

Last February, TI filed a related complaint with the International Trade Commission (ITC), requesting a U.S. ban on dynamic RAM chips that infringed on TI patents. Fujitsu and Sharp, according to the settlement, have been dropped from that request.

The ITC investigation into the remaining seven companies will continue.

MSA to report higher sales, lower expenses

By James A. Martin

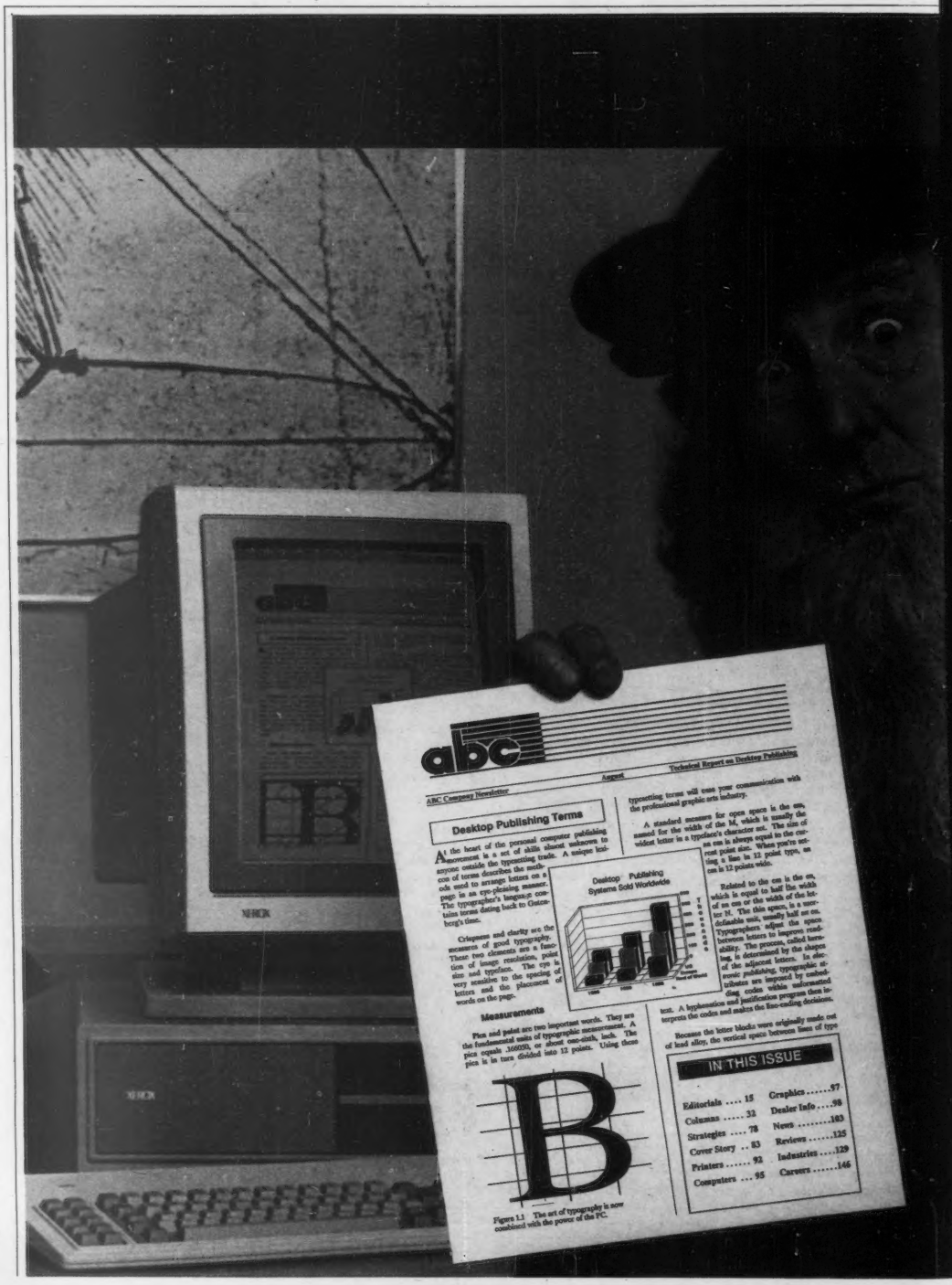
ATLANTA — Management Science America, Inc. (MSA) estimated last week that it will report revenue growth of approximately 25% for 1986.

MSA said profits increased roughly 160% from the firm's relatively sluggish performance in 1985.

The mainframe applications vendor said 1986 operating revenue was between $190 million and $193 million, compared with $151.7 million in 1985. Net income is expected to have been about $18 million, or $1.00 to $1.03 per share, compared with $6.9 million, or 39 cents per share, during the previous year.

Preliminary figures show MSA's sales were higher and its expenses lower than anticipated, according to Mark Finley, an analyst with Gartner Group, Inc. in Stamford, Conn. "There's no big turnaround here, but it looks to be a little better than what most people thought," he said. The increase in profits is most likely a result of cost reductions rather than results from MSA acquisitions in 1986, he added.

MSA's expansion of its customer base and sales force are the primary reasons behind its healthy fiscal year, said Scott Smith, analyst and vice-president of Donaldson, Lufkin and Jenrette, a New York brokerage firm. MSA is expected to report final results in early February.



AT&T to become Southwestern Bell's ISDN customer

In-house switch to allow flexibility

By Elisabeth Horwitt

ST. LOUIS — AT&T signed a four-year contract recently to become the third commercial Integrated Services Digital Network (ISDN) customer of divested Bell operating company Southwestern Bell Telephone Co.

Under the agreement, Southwestern Bell will provide ISDN capability for 2,300 access lines at AT&T's southwest regional headquarters in the St. Louis suburb of Ballwin, Mo. The lines will support digital data, voice and video transmissions within the 400,000 sq-ft facility through a connection to Southwestern Bell's ISDN central office switch in St. Louis.

Switching to ISDN telephone line-based connections from in-house coaxial cable should allow AT&T more flexibility in adding transmission capacity. "This will result in an anticipated savings of $1 million just in time and expense involved in moving data terminals," said Douglas K. Jacobs, regional vice-president for AT&T in St. Louis.

Southwestern Bell said it is involved with AT&T, as well as with Northern Telecom, Inc. and Bell Communications Research Corp., in a technical ISDN trial in St. Louis.

AT&T is Southwestern Bell's third commercial ISDN customer. Last November, Southwestern Bell announced ISDN commitments from Shell Oil Co. and Tenneco, Inc., both in Houston.

Other ISDN contracts are being negotiated within Southwestern Bell Corp.'s five-state area, the company said.

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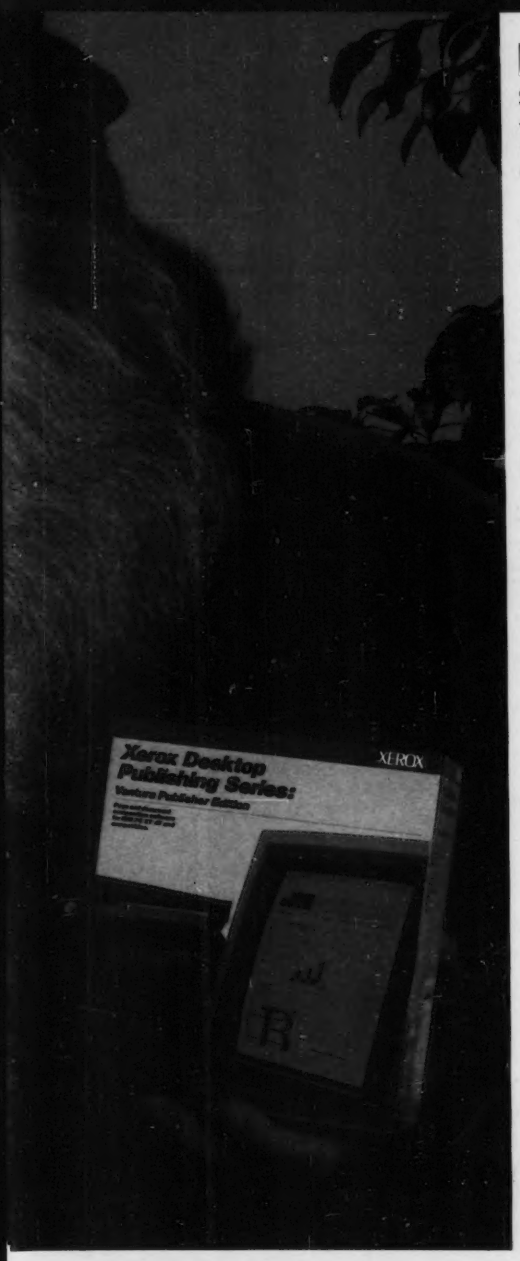

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Ashton-Tate to focus on inside growth

By Alan Alper

NEW YORK — Ashton-Tate expects its growth in 1987 to come primarily from internally developed products, as opposed to acquired software, Chairman Edward M. Esber Jr. told a recent meeting of security analysts.

Regarding acquisitions, Esber said the firm is interested in companies that would extend Ashton-Tate's product portfolio into uncharted areas. "We would be interested in new software categories or technology and the right mainframe or mini data base software company if it came along," he said.

Esber remains convinced that Ashton-Tate's microcomputer approach to data base management will persevere in contrast to competing products and mainframe and mini methods. Ashton-Tate has shipped 1.1 million units of its Dbase family, a figure that Esber said is more than double mainframe or mini data base management system shipments. "There appears to be a high resistance to change among data base users," he suggested.

With the flagship Dbase family expected to remain strong and with a data base product for the Apple Computer, Inc. Macintosh expected to ship in the next quarter, analysts predict Ashton-Tate will continue to perform well. For the nine months ended Oct. 31, net income was up 89% to $19.5 million on a revenue increase of 85%, to $147.9 million.

Esber said he is convinced that IBM Personal Computers and Apple Macintoshes will have to coexist in the work groups that make up departmental computing. As part of its "synergistic cooperation with Apple," Ashton-Tate has pledged to provide software to enable PCs and Macintoshes to trade files, he observed.

"I expect 1987 to be a good year," Esber said. "We will grow at the same rate as the software business."

Silicon Graphics, Convex ally in joint marketing, development pact

By James Connolly

RICHARDSON, Texas — Convex Computer Corp. and Silicon Graphics, Inc. last week joined forces in an attack on the high-performance, three-dimensional graphics market by signing a joint development and cooperative marketing agreement.

Under the agreement, the companies hope to combine Silicon Graphics' strength in interactive three-dimensional graphics workstations with Convex's near-supercomputer technology. The companies will cooperate in software development and marketing efforts, including joint sales calls and promotion.

The companies will pair Silicon Graphics' Iris Superworkstation with Convex's C1 series of near-supercomputers, which use a technology based on the Cray Research, Inc. supercomputer architecture.

The alliance will target applications such as computational fluid dynamics, mechanical engineering and molecular modeling applications.

"This cooperative effort between Convex and Silicon Graphics makes possible the computation and visualization of large simulations at an accessible price," said Steve Wallach, vice-president of technology for Convex.

Sprint joins EDS in job bid

To vie with AT&T, MCI for GSA contract

By Mitch Betts

WASHINGTON, D.C. — Industry competition for the federal government's coveted $4.5 billion telecommunications contract received a new entry recently when U.S. Sprint Communications Co. announced it will team up with Electronic Data Systems Corp. (EDS) to bid for the so-called Federal Telecommunications System (FTS) 2000 contract.

Officials said the team combines the systems integration and software experience of Dallas-based EDS with the all-digital, fiber-optic network of U.S. Sprint. They will be competing against two other teams, one that pairs AT&T and Boeing Computer Services Co. and another that includes Martin Marietta Corp. and MCI Communications Corp. [CW, Dec. 15].

The General Services Administration (GSA) on Jan. 7 released the final bid request document for the FTS 2000 long-distance network. Bids will be made in June, and the 10-year contract will be awarded by the end of 1987.

The GSA is seeking a digital, software-defined network for voice and data traffic. Those specifications fit well with U.S. Sprint's virtual private network offering, according to U.S. Sprint officials.

U.S. Sprint officials also said that the FTS 2000 network is similar to the private digital network that EDS is implementing for its parent company, General Motors Corp.

National Semi to close POS plant

By Clinton Wilder

SANTA CLARA, Calif. — Still showing the effects of the long-depressed U.S. chip industry, National Semiconductor Corp. will close a point-of-sale terminal manufacturing plant and take a one-time charge of $15 million.

National Semiconductor will shut its Maynard, Mass., Datachecker production facility, transferring its production to Datachecker plants in Santa Clara, Calif., and Hong Kong. The company will lay off 250 employees.

The associated charge, to be taken in the firm's third fiscal quarter, which ends March 8, virtually assures the firm another quarter in the red. Although National Semiconductor earned a small profit from operations in the last two quarters, it reported net losses of $1.4 million and $5.7 million in the first and second quarters, respectively.

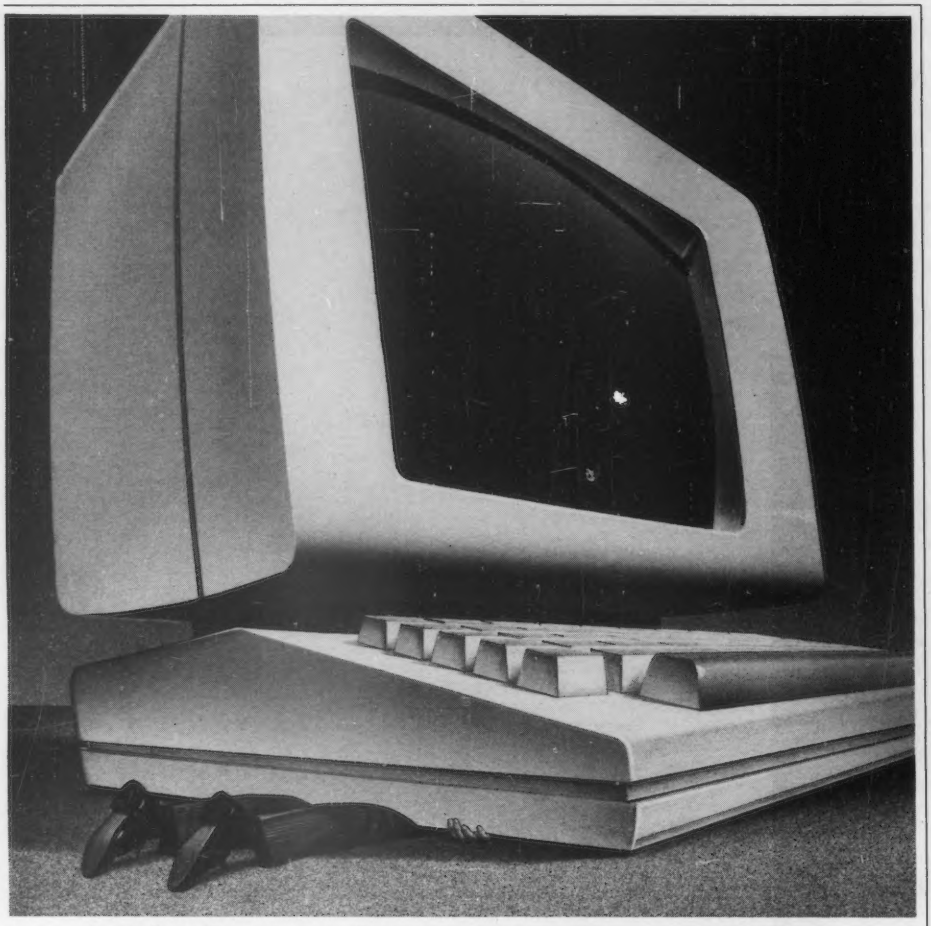
SAS acquires compiler firm

By James A. Martin

CARY, N.C. — SAS Institute, Inc. announced it has acquired Lattice, Inc., the developer of a highly regarded C language compiler, for an undisclosed amount.

The affiliation between SAS, an IBM mainframe software vendor, and Lattice dates to 1984 when SAS began marketing the Lattice C compiler for IBM mainframes and developing SAS software programs with the C language.

Although this is the first such merger for SAS, President James Goodnight does not see acquisition as a new corporate growth plan. "We will consider acquisitions, though, when they make sense, when there is a logical and strategic fit with our goals," he said.



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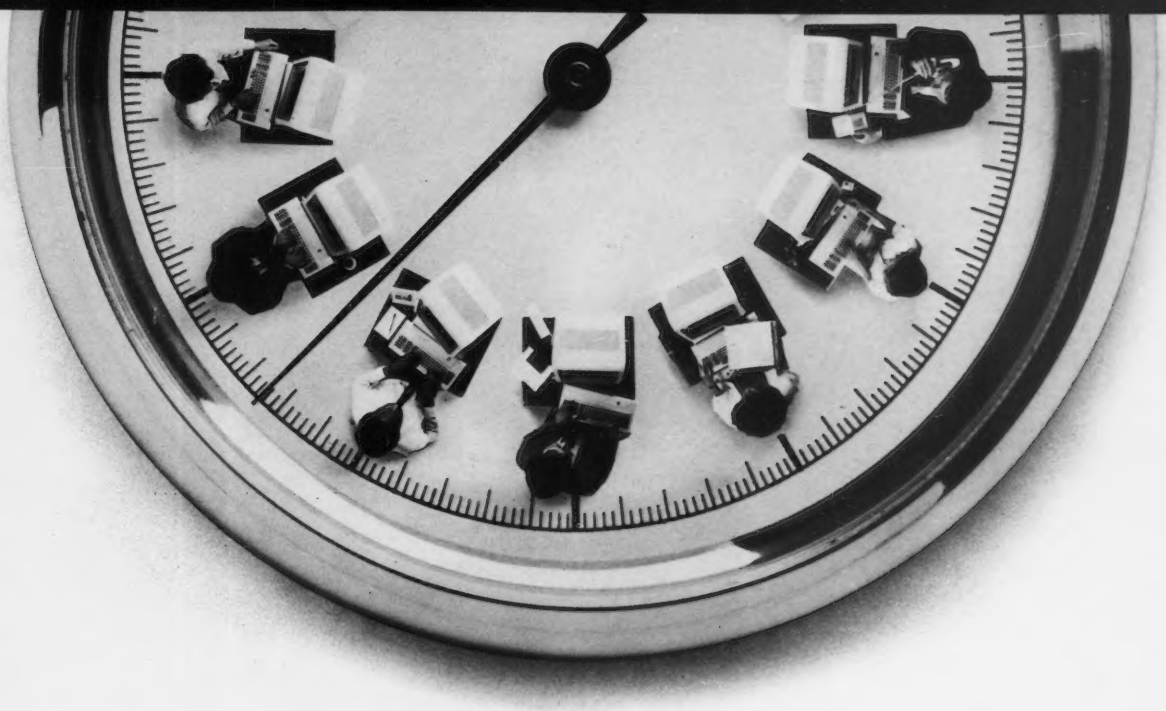

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Banking software is heating up

From page 94

nesses by gobbling up acquisitions, EDS hopes to be ready with a system that can integrate the multiple data bases of such financial miniconglomerates.

Norwest and Bank One, like Security Pacific Information Services in Los Angeles, Dallas-based MCorp, Wachovia Corp. in Winston-Salem, N.C., and others, are seeking to establish themselves as providers of computer products and services as well as banking services.

Also in this category is the Texas Commerce Information Systems unit of Houston-based Texas Commerce Bancshares, Inc., which last fall inked an unusual agreement with small software vendor BKW Systems, Inc. in Nashua, N.H.

Formidable competitor

Texas Commerce will distribute and support BKW's bank software running on Wang Laboratories, Inc. systems and also develop an IBM 4300 version of the programs. The interesting twist to this deal is that BKW Systems is currently operating under Chapter 11 bankruptcy protection.

According to San Francisco-based Hambrecht & Quist, Inc. analyst Osman Eralp, who specializes in banking software, the EDS-Bank One-Norwest venture will not produce a deliverable system "for at least two years and possibly much longer." But when it does — having presumably picked up a few more major banks as partners in the interim — it could prove a formidable competitor for IBM/Hogan and certainly for the Anacomps and Uccels of the world.

"We believe that IBM and EDS eventually have to win," Eralp concludes, "probably at the expense of the others in varying degrees."

After a slow start, IBM now appears to be fully geared up to hawk the Hogan products, much to the consternation of ADAPSO, whose Bernard Goldstein called on Big Blue to cease and desist at the software vendor's association anniversary bash in Phoenix last fall.

Goldstein was particularly concerned about IBM buying the souls of vendors in other vertical markets. Given all of IBM's hardware revenue trends and its celebrated lack of success in applications software, it seems inevitable that Goldstein's fears will be borne out.

But it is telling that Big Blue chose high-end banking software for its first major foray with another vendor's products. The overall economic health of the banking sector and the formation of much larger regional banks offering a full coterie of financial services should combine to create a heavy, long-term demand for sophisticated software that can handle banking chores.

IBM and EDS certainly think so, and the banks themselves, like Bank One and Norwest, will continue to seek their own pieces of change from that growing information services dollar. With the presence of two of the computer industry's largest players both aligned with unconventional partners, the banking software market bears close watching.

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Digital Communications Associates, Inc. announced revenue for the second quarter ended Dec. 31 of $46.1 million, compared with $38.9 million a year earlier. Profits were $8.7 million, or 58 cents per share, up 124% from $3.9 million, or 31 cents per share, reported a year earlier.

■

Tandon Corp. reported revenue for the year ended Sept. 28 of $214.1 million, compared with $268.8 million in the previous year. Net loss for the year was $62.8 million, or $1.24 per share, compared with a loss of $135.4 million, or $2.66 per share, during the previous year.

For the fourth quarter, revenue was $56.4 million, compared with $54.7 million in the year-ago quarter. Net loss was $45.3 million, or 89 cents per share, compared with $85.1 million, or $1.67 per share, in the corresponding period one year earlier.

■

On-Line Software International, Inc. reported net income for the second quarter ended Nov. 30 of $1 million, or 25 cents per share, compared with $578,000, or 15 cents per share, a year earlier. Revenue for the quarter was $12.7 million, compared with $8.6 million for the year-ago period.

■

Kaypro Corp. announced revenue for the quarter ended Nov. 28 of $30 million, a 113% increase from revenue of $14.1 million in the comparable period last year. Net income was $1.3 million, or four cents per share, including an extraordinary income-tax carryforward credit of $515,000, or one cent per share. This compares with a net loss of $2.5 million, or seven cents per share, the previous year.

■

Adobe Systems, Inc. announced revenue for the fourth quarter ended Nov. 30 of $5.2 million, compared with $2 million in the year-ago period. Profits were $1 million, or 19 cents per share, compared with $486,000, or 11 cents per share, in the like quarter a year earlier.

For the year, revenue was $16.1 million, compared with $4.6 million in the previous year. Profits were $3.6 million, or 76 cents per share, compared with $496,000, or 11 cents per share, the previous year.

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It's Monday morning. Your

8:30 A.M. • TOKYO, JAPAN

IDG's International Data Corporation managing director **Yugi Ogino** is stopped in his tracks by a flash report on the company's International News Service. *Digital News* has just spotted a potential challenge to IBM's grip on the professional PC market: DEC has announced their Local Area VAX Cluster. Ogino sets up a conference call with *Computerworld Japan* editors to brief them on his analysis.

8:40 A.M. • SYDNEY, AUSTRALIA

At almost the same moment 4,300 miles to the south. *Computerworld Australia* publisher **Susan Coleman** sees the DEC story on her news wire. She calls in **Peter Scott**, her editor, to plan editorial coverage for their market.

11:00 A.M. • HELSINKI, FINLAND

Halfway around the world, **Timo Tolsa**, editor of IDG's Finnish computer newspaper *Tietoviikko Ky*, faxes his comments on the pending story to **Dieter Echbauer**, editor of *Computerwoche* in Germany, who appoints an editorial team to file a comprehensive story for use by all five IDG publications in Germany.

10:10 A.M. • BUENOS AIRES, ARGENTINA

Ruben Argento, the head of IDG's *Computerworld* newspaper in Argentina uncovers a new wrinkle in the rapidly unfolding story—and alerts Doane Perry, senior market consultant at IDC in Framingham, Massachusetts: a DEC competitor in South America is developing a similar cluster product.

world just changed again.

10:30 A.M. • BOSTON, MASSACHUSETTS

IDG reporter **Kathryn Esplin** files a VAX Cluster story for *Digital News*. Her back-up analysis is sent to all publication offices around the world on the company's news wire.

2:00 P.M. • FRAMINGHAM, MASSAC TS

Perry meets with **Bill Ford**, IDC Information Industry Services Chief, to plan a global research report on computer clusters and their potential impact on business users.

4:45 P.M. • PALO ALTO, CALIFORNIA

IDC Research Director **Jean Yates** faxes detailed schedules of the report requirements to IDC research centers in 16 other countries. Deadline: 1 week. Overnight mail announcements of the pending report are mailed to IDC's top 1,000 customers around the world.

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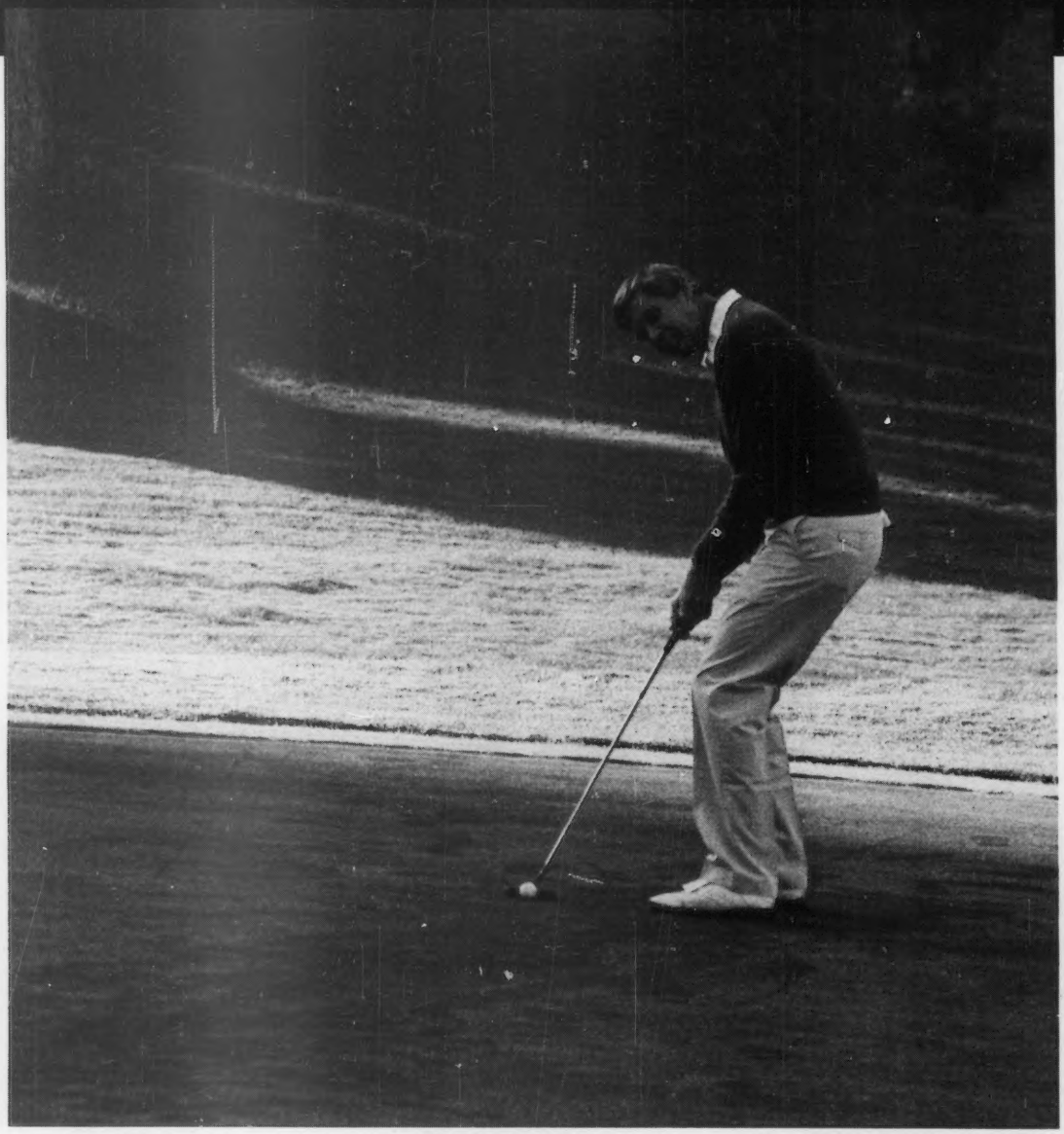

Bob Ashworth
VP General Manager
Information Technologies Division
McKesson Corporation
Age: 44
Budget: $65 million
Golfer

With micros, networking and telecommunications becoming more important every day, the influence of Information Services is extending well beyond its traditional boundaries. And with it, the influence of IS professionals. Bob Ashworth and thousands of other aggressive computer professionals like him are clearly on the fast track in America's larger corporations, controlling more than $120 billion every year.

Bob started with McKesson, the world's largest distributor of pharmaceutical products, as a project manager in applications development. His biggest single responsibility: the implementation of McKesson's proprietary Economost micro-based inventory/ordering system for druggists, which has often been credited with the company's fast rise to leadership in the highly competitive pharmaceutical distribution industry. With Economost running smoothly, Bob's attention is primarily devoted to serving the corporation at large. That means providing decision support for those who need it, guiding the company in its acquisition of PCs (600 to date), and assessing the potential applications and value of a corporate LAN.

In his spare time, Bob's an avid golfer, a snow skier, water skier and a jogger.

As you can see, Bob's schedule is full. But if you want to reach him, there's one surefire way.

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Bob regards Computerworld as one of the essential tools of the trade. He finds it gives him the big picture far better than any micro book can.

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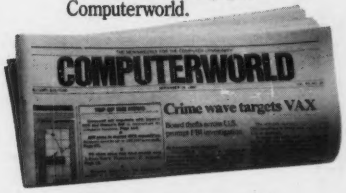

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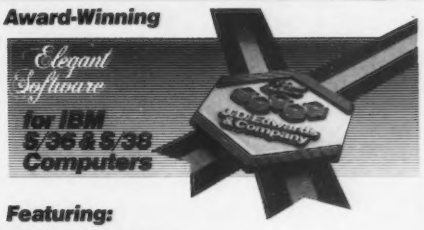

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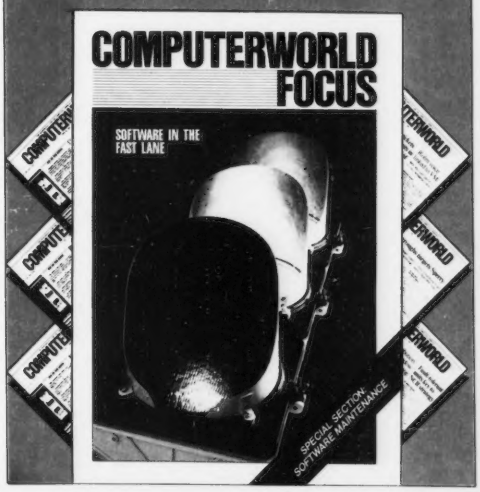

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Letters of nomination or application with resume should be submitted by February 23, 1987 to Mr. Lowell Levi, Chairperson, Advisory Committee for the Selection of the Director of AIS, Michigan State University, Office of the Controller, 305 Administration Building, East Lansing, Michigan 48824-1046.

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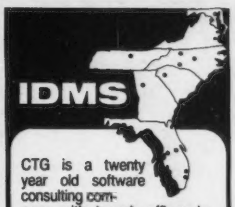

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Users searching for alternatives to dead-end 8100 machines

By Jean S. Bozman

IBM's installed base of 8100 users has embarked on an urgent search for alternatives to the aging machine, a system that IBM said last year it will not enhance.

A recent survey indicates 60% of 8100 users plan to migrate — or are currently migrating — away from the 8-year-old product line. The survey, conducted by Dallas-based consulting firm B. R. Blackmarr and Associates, Inc., polled 25% of all domestic 8100 sites last summer — including about 2,000 machines.

In 1985, there were about 15,000 IBM 8100s in the world, approximately 8,000 of them in the U.S., according to industry estimates.

IBM 8100
Demand for new systems

Industry	Number of Systems Needed in Next Two years	Number of Firms Responding
Aerospace	0	5
Chemical and Allied Products	13	7
Communications	6	5
Financial	13	10
General Manufacturing	20	39
Government	152	23
Insurance	248	34
Legal/Medical	17	6
Retail	5	4
Utilities	63	12
Other	131	18
No Response	16	16
Total	**684**	**179**

INFORMATION PROVIDED BY B.R. BLACKMARR AND ASSOCIATES

The survey indicates that 37% of users running 8100s with the DPCX operating system are actively moving to another product, but only 18% of the DPPX operating system users said they are currently migrating.

But 31% of DPPX users said they were planning to migrate, as were 23% of DPCX users.

Less than 25% of all DPCX users and less than 33% of all DPPX users said they were unconcerned about migration (see chart at right).

Some users questioned by *Computerworld* said they view the 8100 dilemma as an opportunity to move away from what they believe is an ungainly combination of communications controller and office workhorse.

"I got rid of the 8100s as soon as I could," said one Midwestern MIS manager. "We spent a lot of time customizing the applications, and it never really delivered on our manufacturing application."

A report based on the survey will not be published until March, but some conclusions can be drawn already, according to Blackmarr President Brian Blackmarr. The survey shows that users in the government and insurance sectors — large users of the DPCX operating system — are feeling the greatest pressure to expand their processing capacity.

IBM 8100
Migration planning

Response	Use Only DPPX	Use Only DPCX
In Progress	18%	37%
Budget Defined and Planned	3%	2%
Planned Effort but not started	31%	23%
Not Concerned	33%	25%
Other	15%	14%
Total Respondents	**61**	**118**

Due to rounding, total does not equal 100%

INFORMATION PROVIDED BY B.R. BLACKMARR AND ASSOCIATES.

IBM has already said that it will not support DPCX on another IBM product line. It was DPCX that gave the 8100 a wide range of office automation capabilities.

Others, who run manufacturing and retail applications under DPPX, said they feel somewhat less pressure.

Some of them are still buying the 8100 from IBM's stockpile. IBM has indicated it will support DPPX on the IBM 9370 departmental processor (see story page 1).

Large users of DPCX drove many sales of 8150s in recent years, causing the market to expand slightly at the end of the 8100's product cycle.

Among them is Travelers Insurance Co.'s Joseph Brophy, senior vice-president, who said he has no immediate plans to replace his 8100s, which at one time numbered 500.

But throughout the next two to four years, the insurance company plans to move more of the function either up to the host or down to the microcomputers in the field.

"Originally, we went to the 8100s to get better response time and better availability than we had in the 1970s. But most of those reasons aren't as important today because there are better alternatives," Brophy said.

Competitors hunger for user base

The retreat of IBM's 8100 distributed processing systems presents a challenge for competing vendors to correctly position their own computer products to provide for the needs of 8100 users.

Who stands to benefit by exploiting the gap in IBM's line isn't clear. A study by B. R. Blackmarr and Associates, Inc. (see story above) shows that different 8100 shops have widely different needs and that migration could well benefit different computer vendors, depending on application.

Blackmarr and Associates has written migration code for the Digital Equipment Corp. and Wang Laboratories, Inc. machines, but it has not yet made it available to users.

Users feel they do not have much time to identify their choice.

"The sense of urgency is clearly there," says Keith Brown, a Blackmarr and Associates vice-president. "You find users asking, 'Where am I going to get more capacity?', and IBM's alternative, whatever it is, isn't ready yet."

The Blackmarr study, which was supported by vendors including IBM, DEC, Hewlett-Packard Co. and Wang, was designed to identify those features of the 8100 that users felt were critical to the success of any alternative or follow-on IBM product.

"IBM and other vendors are asking what it will take to meet these requirements now that the 8100 is running out of horsepower," says Brian Blackmarr, president of Blackmarr and Associates.

On-site testing

As part of the study, an on-site testing program at American Express Co.'s 8100 data processing facility in Phoenix is comparing features of five types of alternative minicomputer hardware. On the list are systems from DEC, Wang and NBI, Inc.

However, the tests at American Express, which continue this week, will have no clear winner, Brown says. "It isn't considered to be a beauty contest," he says. "However, the rating of this fairly sizable user will give vendors pretty good guidance in developing new products."

DPCX users feel that the 8100's Distributed Office Support System (Disoss) functionality will be hard to replace with any other product, including ones from IBM, Blackmarr notes. "The 8100 is the single most functional device for connecting into host-based Disoss," he says.

"Large users, like large insurance firms, use every bit of that capability in their Systems Network Architecture networks today," Blackmarr says. The 8100's 3270 pass-through feature and ability to act as a traffic cop for personal computer and terminal inquiries to the host will not be easily duplicated, either, he adds.

Vendors who have participated in the side-by-side comparison contend that the movement to replace 8100 capacity represents a solid marketing opportunity. "The timing was good for us," says Gary Sobol, manager of systems engineering for NBI in Boulder, Colo. "We had just finished a beta test of our Disoss implementation. We felt that it was a good opportunity to show a consulting group, as well as American Express, the power of our system."

— Jean S. Bozman

Users of 8100 led down path

From page 1

IBM to support DPPX than DPCX on other IBM systems.

"DPPX is programmed in a variant of PL/S, which is the language that all of IBM's major operating systems are programmed in. Because of that, the bulk of DPPX code can be easily recompiled," Ackerman said.

When IBM announced the 8100 in October 1978, the product was the logical descendant of the IBM 3790 cluster controller. The 8100 inherited a relatively small main memory, a penchant for cluster-controlling and the 3790's DOSF operating system, which was incorporated into DPCX as a migration tool for 3790 users.

First 8130s

The first 8130 units, shipped in the fourth quarter of 1979, had just 256K to 512K bytes of main memory. But these units were the first — and at the time the only — IBM machines able to act as true distributed processors, said Ackerman, who is a longtime IBM 8100 consultant and market research analyst.

Ackerman, whose newsletter, *Update/8100*, has chronicled the machine's evolution, said that the 8100 embodied three components of the period's distributed processing theory.

"It was able to act as a host for the terminals that were attached to it, it was in charge of controller/host functions such as 3270 support and RJE," he said, "and it was able to act as an intelligent processor that carried on concurrent communications with the host and with the terminals."

An inheritance

Those kinds of functions were provided by the 8100's DPPX operating system. This operating system was able to process apart from the host and to ready the results for later transmission to the host.

But the 8100 also inherited something else from its 3790 predecessor: the ability to support the 3790's DOSF operating system, which included the first release of the Distributed Office Support System.

A new operating system, DPCX, was written in native mode on the 8100 to support DOSF, supplying the 8100 with office capabilities few machines had in the early 1980s.

Convergent signs OEM pacts

Revises Unisys deal, will resell Banyan LAN

By Clinton Wilder and Elisabeth Horwitt

SAN JOSE, Calif. — Convergent Technologies, Inc. last week restructured its long-standing OEM agreement with a traditional reseller, Unisys Corp., and agreed to resell the local-area network (LAN) products of a new partner, Banyan Systems, Inc.

Convergent Chairman Paul C. Ely Jr. said the agreement with Unisys is intended to stabilize the rags-or-riches inconsistency of Convergent's 6-year-old deal with Burroughs Corp., which became Unisys after acquiring Sperry Corp. last year. The three-year pact requires Unisys to purchase a specified number of Convergent products in order to gain the right to manufacture those products.

The revision, Ely told *Computerworld*, stemmed from difficulties between Convergent and Burroughs during the last three years. When Convergent was unable to manufacture enough Ngen workstations to be resold as Burroughs' B25 in 1983, Burroughs manufactured the product itself, and its purchases from Convergent declined to none.

"There were disruptions in our relationship that almost killed it," Ely said. "The new terms give both companies incentives to do what they need to make it work." The new agreement covers all current Convergent workstations and servers as well as future products in those lines.

Separately, Convergent signed an agreement to purchase and resell Banyan's Virtual Networking Software (Vines). The LAN operating system, working in conjunction with Convergent's PC Exchange software, to be announced this week, will interconnect Convergent's Clusternet LANs and work group servers.

Banyan, of Westboro, Mass., is the first PC LAN vendor to form an alliance with Convergent since the proposed merger beween Convergent and IBM PC Network vendor 3Com Corp. fell through last year.

Banyan is currently working on several OEM relationships, including one with a major private branch exchange manufacturer and several with host vendors, according to Banyan Vice-President of Marketing Robert Stearns.

DEC's earnings surge 98%

From page 94

rector of investor relations.

"We haven't done anything terribly different on cost controls," he said. "If anything, we loosened up a bit."

At a time when many competitors, most notably IBM, are reporting a slowdown in overseas growth, DEC reported a 47% gain in international sales. "That, plus the growth in service revenue, was exceptionally impressive," Geran said.

Steinkrauss said DEC continued to make strong inroads into the financial, insurance and telecommunications markets during the quarter, while also reporting growth in sales to the health care, aerospace, chemicals and electronics-related industries.

However, Steinkrauss also confirmed what DEC's less successful competitors are saying: that computer sales to the MIS shops of traditional manufacturing industries remain sluggish.

"We're still not seeing that core U.S. manufacturing business pick up, and the selling cycle isn't getting any shorter," he said. "But we've proven that with the right resources and the right combination of products, you can still succeed."

Merrill Lynch, ADP sign deal

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tor. "Outside of Prudential-Bache Securities, Inc., they haven't been very successful in attracting national retail brokerage accounts," one industry source said.

Paul Savage, vice-president of sales for ADP's Financial Services Group, conceded that aggressive pricing played a role in the Merrill Lynch deal.

"You have to look at it in the overall context of things, though. Merrill Lynch is a big customer and would certainly get a good volume discount," Savage said. "We feel we're as price competitive as anyone on the street."

Some observers said they were surprised by Merrill Lynch's attempt to forge a relationship with ADP so soon after the Imnet debacle.

"It appears that the bad feelings between Merrill Lynch and Citicorp run deeper than I knew," observed Tom Lawton, editor of "The Computer Services Report" in Belmont, Mass.

"If ADP gets Merrill Lynch's business, it would be a big feather in their cap. I don't expect Quotron to sit still and do nothing about it," Lawton maintained.

"Imnet was formed with the assumption that Quotron was vulnerable," said a financial data processing consultant who requested anonymity. "Merrill Lynch spent a lot of money on Imnet and on Quotron services but would still like to be less dependent on Quotron."

ADP derives about 25% of its annual $1.2 billion in revenue from its financial services business. ADP entered that market in 1983 after acquiring GTE Corp.'s front-office systems operation. Last February, ADP purchased the financial services portion of Allied-Signal, Inc.'s Bunker Ramo subsidiary.

Separately, ADP announced last week that earnings grew 22% to $30 million, or 41 cents per share. ADP's revenue rose 15% to $334.2 million in the second quarter ended Dec. 31.

End-user computing firms should end '86 on high note

ACTIVE ISSUES
Kathy Porteus

When technology companies report December-quarter results this month, investors will hear everything from tremendous gains to flat earnings to sizable write-downs and charges. Generally, those companies directly involved with end-user computing will post the most impressive results.

"Digital Equipment Corp. (DEC — 130) is a hero in the user community," says John Dean of Montgomery Securities. According to Dean, DEC's recognition of networked workstations and personal computer applications for end users continues to lift the company above other minicomputer vendors. Last Wednesday, DEC reported its second-quarter earnings doubled to $2.02 per share, propelling DEC stock more than 11 points to 130.

However, analysts expect results from other minicomputer companies to continue reflecting weak industry conditions. Wang Laboratories, Inc. (WANB — 14), scheduled to report its December quarter tomorrow, has already disclosed that it will post an operating loss in excess of $35 million for the quarter.

The lack of new product deliveries continues to restrain earnings at both Hewlett-Packard Co. (HP — 49) and Prime Computer, Inc. (PRM — 20), according to Dean. He estimates Prime will post earnings of 28 cents per share for its December quarter and HP will report earnings of 45 cents per share when it discloses its January-quarter results.

Although the December quarter traditionally represents a seasonal boost to microcomputer companies, Dean partly attributes expected high quarterly earnings to growing demand for desktop computing power. Dean expects strong quarters from Compaq Computer Corp. (CPQ — 23½) and Businessland, Inc. (BUSL — 12¾), which he estimates will report earnings of 39 cents and 11 cents per share, respectively.

According to Dean, Apple Computer, Inc. (AAPL — 48⅛) will report flat earnings of 90 cents per share versus 91 cents per share for the same period last year. Dean points out, however, that Apple's December quarter results last year were the company's best.

Heightened demand for end-user computing has also benefitted the workstation arena, in which both Apollo Computer, Inc. (APCI — 18½) and Sun Microsystems, Inc. (SUNW — 27) are expected to post boom December quarters.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Mark Stahlman, an analyst with Sanford C. Bernstein & Co., says Apollo will report earnings of 12 cents per share on revenue of $112 million and Sun will earn 25 cents per share on $105 million. "Sun and Apollo's excellent performance will continue in 1987," Stahlman says, "if they simply adhere to their product plans and deliver the new products to existing customers."

On the other hand, Stahlman does not expect impressive financial results from computer-aided design and computer-aided manufacturing (CAD/CAM) suppliers such as Daisy Systems, Inc. (DAZY — 10⅝), Mentor Graphics, Inc. (MENT — 20¾) and Valid Logic Systems, Inc. (VLID — 6½) for at least a few more quarters. According to Stahlman, these companies suffer from weak capital spending and from the CAD/CAM market shift to a design rather than a drafting business.

The theme of end-user computing also emerges in the software sector. Charlotte Walker, an analyst with L. F. Rothschild, Unterberg Towbin, estimates Lotus Development Corp. (LOTS — 57¼) will report 92 cents per share vs. 70 cents per share for the same period one year ago; Ashton-Tate (TATE — 25) will earn 74 cents vs. 59 cents per share one year ago; and Microsoft Corp. (MSFT — 60) will earn 65 cents per share this year vs. 46 cents per share last year.

According to Walker, other December-quarter highlights among software and computer services companies will include Hogan Systems, Inc. (HOGN — 13⅜), Management Science America, Inc. (MSAI —17 ¼), SHL Systems, Inc. (SHKIS — 17) and ASK Computer Systems, Inc. (ASKI — 13⅛). Management Science America said it expects to report a sharp rise in 1986 net income, to the $1-to-$1.03 range, reflecting a very strong December quarter.

Likewise, ASK Computer Systems' December-quarter earnings, which Walker estimates will be 16 cents to 17 cents per share, represent a more impressive sequential, rather than yearly, improvement. Walker estimates Hogan Systems and SHL Systems, with earnings of 13 cents to 15 cents and 13 cents per share, respectively, will report results that represent more than a 100% increase from last year's December-quarter earnings.

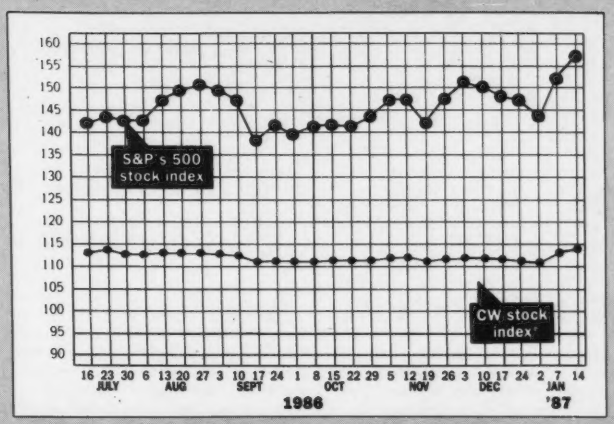
Mainframe hardware companies are expected to take significant fourth-quarter write-downs and charges, generally as a reflection of poor business conditions. "I am reluctant to say what my earnings estimates are because this is a very peculiar quarter," remarks Jay Stevens of Dean Witter Reynolds, Inc.

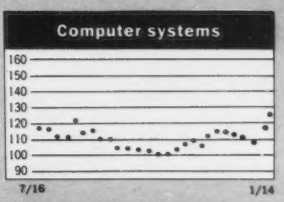
Among those companies taking write-offs are IBM (IBM — 120⅜), because of its early retirement program; Honeywell, Inc. (HON — 61), because of its departure from information systems; and Unisys Corp. (UIS — 86¾), because of the merger of the former Burroughs Corp. and Sperry Corp.

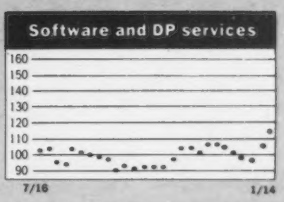
COMPUTER INDUSTRY

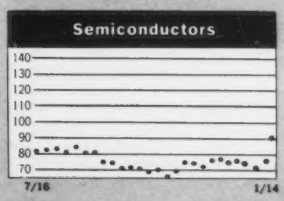
MITCHELL J. HAYES

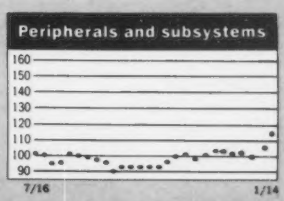
Computerworld stock trading index

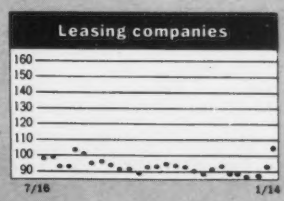


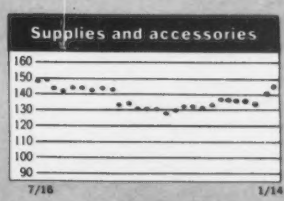












All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	1/7/87	1/14/87
Computer systems	118.3	**125.3**
Software and DP services	107.1	**114.5**
Peripherals and subsystems	108.6	**115.6**
Supplies and accessories	141.7	**146.8**
Semiconductors	78.7	**90.4**
Leasing companies	92.8	**104.5**
CW stock index	113.0	**114.5**
Standard and Poor's 500 stock index	152.7	**157.0**

Computerworld stock trading index

CLOSING PRICES WEDNESDAY, JANUARY 14, 1987

COMPUTER SYSTEMS

E X C H		52-WEEK RANGE (1)		CLOSE JAN 14 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.75	+0.0	+0.0
O	ALTOS COMPUTER SYS	19	10	13.63	+1.4	+11.2
A	AMDAHL CORP	28	14	25.75	-1.0	-3.7
O	APOLLO COMPUTER INC	19	9	18.50	+0.5	+2.8
O	APPLE COMPUTER INC	48	22	48.13	+3.4	+7.5
N	AT&T	28	21	25.25	-0.5	-1.9
O	C P T CORP	7	3	4.25	+0.8	+21.4
N	COMPAQ COMPUTER CORP	24	12	23.50	+1.1	+5.0
A	COMPUTER CONSOLES INC	12	6	9.25	+0.4	+4.2
O	CONCURRENT COMP CORP	25	1	17.00	-0.5	-2.9
N	CONTROL DATA CORP	29	19	25.25	-1.6	-6.0
O	CONVERGENT TECH	14	4	8.25	+1.6	+24.5
N	CRAY RESH INC	100	59	96.00	+7.3	+8.2
O	DAISY SYS CORP	26	8	10.63	+1.1	+11.8
N	DATA GEN CORP	49	25	35.25	+1.1	+3.3
N	DATAPOINT CORP	9	5	5.75	-0.4	-6.1
N	DIGITAL EQUIP CORP	130	69	130.00	+18.6	+16.7
N	FLOATING POINT SYS INC	46	11	13.38	+1.8	+15.1
N	GOULD INC	31	15	19.25	+1.5	+8.5
N	HARRIS CORP	37	26	33.13	+0.9	+2.7
N	HEWLETT PACKARD CO	50	36	49.00	+4.8	+10.7
N	HONEYWELL INC	84	58	59.75	-0.5	-0.8
N	IBM	162	116	118.63	-4.9	-3.9
O	IPL SYS INC	4	1	2.25	-0.1	-5.3
N	ITT CORP	60	35	57.38	+0.8	+1.3
N	M A COM INC	19	12	13.38	+0.3	+1.9
N	MATSUSHITA ELEC INDL LTD	136	61	121.88	-4.9	-3.8
O	MENTOR GRAPHICS CORP	21	11	20.75	+2.1	+11.4
N	NBI INC	14	8	10.38	+1.0	+10.7
N	NCR CORP	57	40	53.38	+3.9	+7.8
N	PRIME COMPUTER INC	28	16	20.00	+1.6	+8.8
O	STRATUS COMPUTER	28	17	27.50	+1.5	+5.8
O	SYMBOLICS INC	15	4	4.88	+0.1	+2.6
O	TANDEM COMPUTERS INC	43	20	42.50	+4.8	+12.6
N	TANDY CORP	49	31	47.88	-0.3	-0.5
N	TEXAS INSTRS INC	148	103	134.00	+14.0	+11.7
A	ULTIMATE CORP	35	13	22.50	-0.5	-2.2
N	UNISYS	90	58	89.13	+2.5	+2.9
A	WANG LABS INC - B	22	11	14.00	+2.5	+21.7
A	WANG LABS INC - C	22	11	13.88	+2.5	+22.0
N	XEROX CORP	72	49	66.25	+3.3	+5.2

SUPPLIES & ACCESSORIES

N	AMER BUSINESS PRODS	37	23	27.38	+0.0	+0.0
N	BARRY WRIGHT CORP	25	14	16.50	+0.4	+2.3
A	DUPLEX PRODS INC	23	18	19.00	+0.5	+2.7
N	ENNIS BUSINESS FORMS INC	29	22	28.13	-0.5	-1.7
N	3M CO	121	86	120.13	-0.3	-0.2
N	MOORE LTD	28	19	22.88	+1.5	+7.0
O	STANDARD REGISTER CO	50	32	39.00	+2.8	+7.6
N	WALLACE COMPUTER SVCS	50	37	47.50	+4.8	+11.1

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID

(1) TO NEAREST DOLLAR

Averages		
Computer Systems	5.92	
Supplies & Accessories	3.60	
Software & DP Services	7.97	
Semiconductors	14.78	
Peripherals & Subsystems	6.50	
Leasing Companies	12.65	
group average	8.57	
indices	last week	this week
Computer Systems	118.3	125.3
Supplies & Accessories	141.7	146.8
Software & DP Services	106.1	114.5
Semiconductors	78.7	90.4
Peripherals & Subsystems	108.6	115.6
Leasing Companies	92.8	104.5
Composite Index	112.9	114.5
S&P 500 Index	152.7	157.0

DONE

SOFTWARE & DP SERVICES

E X C H		52-WEEK RANGE (1)		CLOSE JAN 14 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	5.00	+0.8	+17.6
N	ADVANCED SYS INC	19	12	18.25	+0.3	+1.4
N	AGS COMPUTERS INC	32	17	32.38	+1.1	+3.6
O	AMERICAN MGMT SYS INC	27	11	26.75	+2.8	+11.5
O	AMERICAN SOFTWARE INC	19	9	18.75	+0.0	+0.0
N	ANACOMP INC	7	3	4.00	-0.1	-3.0
O	ANALYSTS INTL CORP	10	4	9.50	+0.8	+8.6
O	ASHTON TATE	26	9	25.00	+0.6	+2.6
O	ASK COMPUTER SYS INC	15	9	13.00	+1.1	+9.5
O	ASTRADYNE COMP IND	3	1	1.66	+0.2	+15.2
N	AUTOMATIC DATA PROC	44	28	42.38	+3.1	+8.0
O	BOOLE & BABBAGE INC	8	4	7.25	+0.9	+13.7
O	COMPUTER ASSOC INTL INC	25	17	16.50	+0.3	+1.5
O	COMPUTER HORIZONS CORP	14	10	12.88	+1.6	+14.4
O	COMPUTER NETWORK TECH	10	4	4.38	+0.1	+1.4
N	COMPUTER SCIENCES CORP	50	30	48.75	+3.8	+8.3
O	COMPUTER TASK GROUP INC	19	11	13.38	+1.1	+9.2
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	16	10	11.75	-1.1	-8.7
N	CULLINET SOFTWARE INC	18	6	8.63	+1.9	+27.8
O	CYCARE SYS INC	17	7	10.00	+1.1	+12.7
O	DUQUESNE SYS INC	33	15	37.00	+1.5	+4.2
N	GENERAL ELEC CO	91	67	91.00	+0.0	+0.0
N	GENERAL MTRS CORP	50	24	28.63	+4.5	+18.7
O	HOGAN SYS INC	14	7	13.88	+2.0	+16.8
O	INFORMATION SCIENCES INC	4	1	1.25	+0.3	+33.3
O	INFOTRON SYS CORP	19	7	8.50	+0.5	+6.3
O	KEANE INC	16	5	6.13	-0.1	-2.0
N	LOGICON INC	39	22	28.88	+0.9	+3.1
O	LOTUS DEV CORP	58	20	57.25	+4.0	+7.5
O	MANAGEMENT SCI AMER	17	11	17.25	+3.5	+25.5
O	MCI COMM CORP	13	6	6.75	+0.1	+1.9
N	MICOM SYS INC	23	10	14.75	+0.0	+0.0
O	MICRO PRO INTL CORP	4	2	2.75	+0.1	+2.3
O	MICROSOFT CORP	62	26	60.00	+6.0	+11.1
O	NATIONAL DATA CORP	26	16	22.75	+0.0	+0.0
O	ON LINE SOFTWARE INT	17	10	15.75	-0.3	-1.6
O	ORACLE SYS CORP	29	13	27.00	+5.0	+22.7
N	PANSOPHIC SYS INC	36	25	33.25	+7.3	+27.9
O	POLICY MGMT SYS CORP	27	15	26.75	+1.8	+7.0
O	PROGRAMMING & SYS INC	11	8	9.00	+0.1	+1.4
O	REYNOLDS & REYNOLDS CO	42	25	33.75	+0.0	+0.0
O	SCIENTIFIC COMPUTERS INC	6	4	6.00	+0.2	+3.2
O	SEI CORP	28	15	21.50	+1.8	+8.9
O	SHARED MED SYS CORP	46	29	45.25	+1.8	+4.0
O	SOFTWARE AG SYSTEMS INC	22	10	14.63	+1.9	+14.7
O	SOFTWARE PUBG CORP	9	5	8.38	+0.3	+3.1
A	STERLING SOFTWARE INC	21	10	12.38	+1.4	+12.5
N	SUNGUARD DATA SYSTEMS	16	10	15.25	+0.5	+3.4
N	UCCEL CORP	30	15	29.38	+2.6	+9.8
N	URS CORP	18	11	17.13	+0.0	+0.0
O	VM SOFTWARE INC	27	12	27.00	+3.3	+13.7

SEMICONDUCTORS

N	ADVANCED MICRO DEV	34	13	18.00	+3.5	+24.1
N	ANALOG DEVICES INC	25	14	19.63	+2.4	+13.8
N	ANALOGIC CORP	15	10	11.00	+0.0	+0.0
N	APPLIED MAGNETICS CORP	20	13	18.38	+1.4	+8.1
O	AVANTEK INC	23	14	16.75	+0.1	+0.8
O	HADCO CORP	6	3	4.50	+1.4	+44.0
O	INTEL CORP	32	16	27.88	+4.6	+19.9
O	MICRO MASK INC	7	2	4.50	+0.3	+5.9
N	MOTOROLA INC	50	34	43.50	+6.0	+16.0
N	NATIONAL SEMICONDUCTOR	16	8	13.38	+1.8	+15.1
N	TERADYNE INC	30	16	19.13	+2.5	+15.0

PERIPHERALS & SUBSYSTEMS

A	AM INTL INC	9	5	7.13	-0.3	-3.4
A	ANDERSON JACOBSON INC	3	1	1.88	+0.1	+7.1
O	AST RESH INC	28	11	16.25	+2.1	+15.0
O	AUTOTROL CORP	10	5	6.00	+0.0	+0.0
O	AVANT GARDE COMPUTING	7	3	4.88	+0.0	+0.0
O	BANCTEC INC	13	6	10.88	+0.3	+2.4
N	BOLT BERANEK & NEWMAN	51	34	50.00	+5.0	+11.1
A	CETEC CORP	9	5	5.25	+0.1	+2.4
A	COGNITRONICS CORP	6	2	3.50	+0.5	+16.7
N	COMPUGRAPHIC CORP	27	16	21.25	+1.6	+8.3
N	COMPUTERVISION CORP	19	10	15.63	+1.1	+7.8
N	CONRAC CORP	18	12	13.50	+0.0	+0.0
A	DATAPRODUCTS CORP	18	11	14.13	+1.9	+15.3
A	DATARAM CORP	18	7	8.63	+1.5	+21.1
O	DATA SWITCH CORP	9	5	5.63	-0.5	-8.2
O	DATUM INC	7	4	5.38	+0.6	+13.2
N	DECISION INDS CORP	15	8	10.88	+1.3	+13.0
O	ENDATA INC	8	4	8.25	+1.3	+17.9
O	EMC CORP	24	11	22.00	+1.0	+4.8
O	EVANS & SUTHERLAND	31	18	30.50	+2.8	+9.9
N	FLOATING POINT SYS INC	46	11	13.38	+1.8	+15.1
O	GANDALF TECHNOLOGIES	8	5	8.00	+0.4	+4.9
N	GENERAL DATACOMM IND	15	8	9.25	+0.8	+8.8
N	HAZELTINE CORP	30	16	29.75	+0.0	+0.0
O	ICOT CORP	13	8	10.13	+0.8	+8.0
O	INFORMATION INTL INC	18	13	14.00	+0.1	+0.9
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	12.63	+0.5	+4.1
O	MEGADATA CORP	5	2	2.88	+0.1	+4.5
A	MSI DATA CORP	14	10	12.25	+0.6	+5.4
N	NASHUA CORP	28	15	25.00	+2.6	+11.7
O	NETWORK SYS CORP	17	10	15.88	+0.3	+1.6
N	NORTH AMERN PHILIPS CORP	48	35	44.63	+1.0	+2.3
N	NORTHERN TELECOM LTD	38	25	35.13	+1.5	+4.5
O	NOVELL INC	35	14	34.50	+5.8	+20.0
N	PARADYNE CORP	11	4	4.88	-0.1	-2.5
A	PENRIL CORP	9	4	4.38	+0.0	+0.0
N	PLESSEY PLC	38	22	28.75	+0.9	+3.1
O	PRINTRONIX INC	15	10	10.00	-0.3	-2.4
O	QMS INC	16	10	10.13	+0.8	+8.0
O	RAMTEK CORP	7	3	5.38	-0.3	-4.4
N	RECOGNITION EQUIP INC	20	10	19.25	+0.3	+1.3
O	SCAN TRON CORP	19	11	17.00	+1.3	+7.9
N	SCIENTIFIC ATLANTA INC	15	9	13.00	+1.4	+11.8
O	SEAGATE TECHNOLOGY	27	8	26.13	+4.1	+18.8
N	STORAGE TECHNOLOGY	7	2	3.75	-0.1	-3.2
O	SUN MICROSYSTEM INC	28	11	27.00	+0.9	+3.3
A	T-BAR INC	8	5	8.13	+0.4	+4.8
A	TAB PRODS CO	16	11	16.00	+1.9	+13.3
O	TANDON CORP	8	2	3.00	+0.5	+20.0
A	TEC INC	7	3	3.50	+0.0	+0.0
N	TEKTRONIX INC	77	55	76.50	+3.3	+4.4
O	TELEVIDEO SYS INC	4	2	2.63	+0.4	+16.7
N	TELEX CORP	77	52	76.88	+3.0	+4.1
N	TIMEPLEX INC	30	14	28.25	+1.5	+5.6
N	TITAN CORP	12	6	8.25	+1.3	+17.9
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	21	11	20.38	+0.5	+2.5

LEASING COMPANIES

N	COMDISCO INC	25	14	20.00	+2.9	+16.8
N	CONTINENTAL INFO SYS	12	7	9.63	+0.0	+0.0
O	FINALCO GROUP INC	5	2	3.44	+0.5	+17.0
O	PHOENIX AMERN INC	6	3	5.13	+1.1	+28.1
O	SELECTERM INC	12	5	5.50	+0.5	+10.0
N	U.S. LEASING	47	38	46.00	+1.8	+4.0

COMPUTER INDUSTRY

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INSTANT ANALYSIS

"We're gaining market share and improving profitability at the same time. Wall Street has a fond appreciation for that."

— Mark A. Steinkrauss, director of investor relations at Digital Equipment Corp.

DEC's earnings surge 98%

Exceeds IBM's profit margin for first time

By Clinton Wilder

MAYNARD, Mass. — Continuing the industry-defying financial performance that has become its recent standard, Digital Equipment Corp. last week reported a 98% surge in profits in its second quarter ended Dec. 27.

The results, achieved on a relatively modest 22% sales increase, closed DEC's 1986 calendar year with four consecutive quarters in which net income increased by at least 85%. The quarter also marked the first time DEC's gross profit margins exceeded those of IBM, according to E. F. Hutton & Co.'s Michael Geran and other industry analysts.

Tomorrow, IBM is expected to report its second straight year of lower earnings, ending in what is widely considered to be a particularly weak fourth quarter. On the same day, DEC is scheduled to unveil its new high-end systems, consisting of clustered VAX 8700s that are directly targeted at the traditional IBM mainframe market.

DEC posted second-quarter profits of $270 million, or $2.02 per share, up from $136.1 million, or $1.08 per share, a year earlier. Sales rose to $2.27 billion from $1.86 billion in the second quarter of fiscal 1986. Revenue from services was particularly strong, increasing 36% to $736.1 million.

DEC held its year-to-year cost increase to a paltry 0.6%, despite hiring some 3,000 new employees during the quarter. The company's greatest gains in profit margin, however, came from a larger percentage of mid-range and high-end VAX systems in its product sales mix during the quarter, according to Mark Steinkrauss, DEC's di-

See **DEC** page 92

Merrill Lynch, ADP sign deal

By Alan Alper

ROSELAND, N.J. — Automatic Data Processing, Inc. (ADP) last week said it has agreed to develop a customized stock quote service system for investment and brokerage house Merrill Lynch & Co.

The agreement comes on the heels of the demise of International Marketnet (Imnet), a joint venture that Merrill Lynch entered with IBM to develop a financial information system for both internal use and to market to other brokerage houses [CW, Jan. 12].

The deal appears to jeopardize the continuation of Merrill Lynch's relationship with Quotron Systems, Inc. in Los Angeles, the firm's current supplier of financial information services and equipment. Merrill Lynch is Quotron's largest customer and accounts for approximately 25% of its revenue. Quotron, now owned by Citicorp, has a contract with Merrill Lynch that runs until 1988 and contains an option to renew for 1989.

A Merrill Lynch spokesman said the deal with ADP does not mean it is unhappy with Quotron. "Merrill Lynch historically has tried to improve upon what systems we have," he said. "Our strategy is if XYZ supplier has a better product, we go with the other product."

George Levine, Quotron's sales and marketing vice-president, said it is one thing for ADP to agree to develop a customized quote system and quite another to meet the stringent functional and delivery demands of a large customer such as Merrill Lynch. "Merrill Lynch and IBM did not succeed in their joint mission. I guess we have to see if ADP has the ability to improve upon that strategy," he said.

Wall Street sources last week said ADP has recently made its volume discounts more attractive in an effort to drum up new business in the financial services sec-

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INDUSTRY INSIGHT
Clinton Wilder

Bank software is heating up

As more and more user corporations continue to blur the user/vendor line by offering information products and services, the competitive landscape in certain industry segments is becoming very confusing. Logically, the hotter the market is, the more unusual partnerships one finds springing up within it.

One of the more coveted markets now, especially for its growth potential in the 1990s, is high-end software for the banking and financial industries.

The IBM-Hogan Systems, Inc. OEM deal of 1986 has obviously been the focus of much attention and controversy. But another computer industry titan, Electronic Data Systems Corp. (EDS), has been quietly mounting its own assault on the same market.

Last week, EDS signed up its second user partner, $20 billion Minneapolis-based bank holding firm Norwest Corp., for its project to develop a retail bank processing system for — what else? — large financial institutions. EDS's first partner last August was Bank One, an affiliate of Columbus, Ohio-based Banc One Corp., which owns banks doing an annual $12 billion in business in four Midwestern states.

EDS is seeking other major regional banks to provide user evaluation and review the system's functional design. As formerly regulated regional banks quickly become major interstate busi-

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Wilder is Computerworld's senior editor, computer industry.

Court upholds injunction DEC sought against Emulex

By Alan Alper

CONCORD, N.H. — A U.S. District Court judge last week reinstituted an earlier injunction sought by Digital Equipment Corp. to prevent DEC-compatible peripherals maker Emulex Corp. from marketing products using allegedly misappropriated DEC technology.

The ruling overturned a November appeals court decision that removed, on procedural grounds, one provision of a preliminary injuction that was granted seven months earlier [CW, Nov. 17].

According to a DEC spokesman, the new injunction is more specific in forbidding Costa Mesa, Calif.-based Emulex from manufacturing and marketing any product benefiting from allegedly stolen trade secrets.

DEC filed suit against Emulex 18 months ago, alleging that Emulex infringed on its patents related to certain disk and tape controllers.

Suit amended

The suit was later amended to include misappropriation of trade secrets after DEC claimed that a former employee had allegedly taken information with him when he joined Emulex in early 1985.

Emulex said the ruling would have no effect on any of its current products or revenue. The firm added that the ruling does not prohibit it from shipping any of its products currently in production.

The preliminary injunction, however, will affect future products beginning with SMDI, a storage subsystem that was set to begin shipping this quarter.

Intel posts sixth straight loss

But analysts say industry could see turnaround

By James A. Martin

SANTA CLARA, Calif. — Intel Corp. reported last week a fourth-quarter net loss of $16.5 million, the company's sixth consecutive quarterly loss.

For the year ended Dec. 27, the semiconductor manufacturer reported a net operating loss of $173.2 million, compared with a reported net income the previous year of $1.6 million.

However, Intel's annual revenue declined to $1.27 billion, compared with $1.36 billion in 1985. Fourth-quarter revenue rose 12% to $355.6 million, compared with $317.9 million the year before.

Although industry leaders Intel and National Semiconductor Corp. have recently reported losses, the Semiconductor Industry Association said last week that semiconductor orders increased 8.8% and shipments grew 14.7% in the fourth quarter. This statement fueled speculation that an industry turnaround was imminent.

'A lot of confusion'

These conflicting reports have created "a lot of confusion," according to Drew Peck, semiconductor analyst with Gartner Securities in Stamford, Conn.

Some analysts have predicted Intel's revenue will increase 5% to 6% this year; all agree that its 80386 microprocessor should give the company a boost.

"But most expectations for their recovery are much too high," Peck said. "It will be a tough road for them to get much beyond a break-even point."

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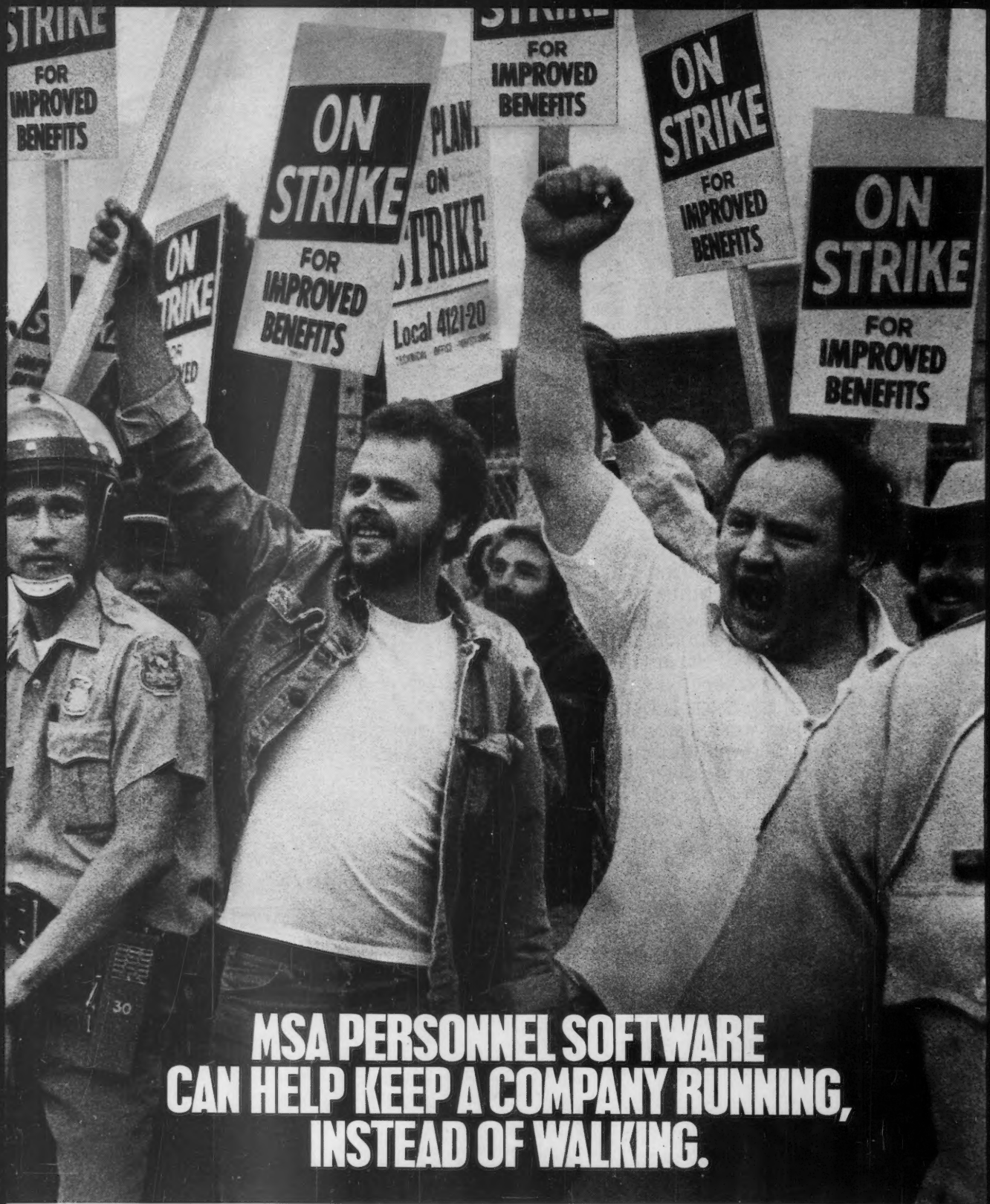

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